



FEMA

July 15, 2011

Mr. Chris Crew
State Hazard Mitigation Officer
North Carolina Division of Emergency Management
4713 Mail Service Center
Raleigh, North Carolina 27699

Reference: Single-Jurisdictional Hazard Mitigation Plan: Town of Sunset Beach, North Carolina

Dear Mr. Crew:

We are pleased to inform you that the Town of Sunset Beach Hazard Mitigation Single-jurisdictional Plan is in compliance with the federal hazard mitigation planning standards resulting from the Disaster Mitigation Act of 2000, as contained in 44 CFR 201.6. The plan is approved for a period of five (5) years, to July 15, 2016.

This plan approval extends to the following participating jurisdiction that provided a copy of its resolution adopting the plan:

- Town of Sunset Beach

The approved participating jurisdiction is hereby an eligible applicant through the State for the following mitigation grant programs administered by the Federal Emergency Management Agency (FEMA):

- Hazard Mitigation Grant Program (HMGP)
- Pre-Disaster Mitigation (PDM)
- Severe Repetitive Loss (SRL)
- Flood Mitigation Assistance (FMA)

A fifth program, Repetitive Flood Claims (RFC), does not have a requirement for a local Hazard Mitigation Plan. National Flood Insurance Program (NFIP) participation is required for some programs.

We commend the participants in the Town of Sunset Beach plan for the development of a solid, workable plan that will guide hazard mitigation activities over the coming years. Please note that all requests for funding will be evaluated individually according to the specific eligibility and other requirements of the particular program under which the application is submitted.

For example, a specific mitigation activity or project identified in the plan may not meet the eligibility requirements for FEMA funding, and even eligible mitigation activities are not automatically approved for FEMA funding under any of the aforementioned programs. In addition, please be aware that if any of the approved jurisdictions participating in this plan are placed on probation or are suspended from the National Flood Insurance Program, they may be ineligible for certain types of federal funding.

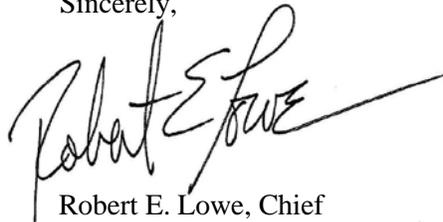
We strongly encourage each Community to perform an annual review and assessment of the effectiveness of their hazard mitigation plan; however, a formal plan update is required at least every five (5) years.

We also encourage each Community to conduct a plan update process within one (1) year of being included within a Presidential Disaster Declaration or of the adoption of major modifications to their local Comprehensive Land Use Plan or other plans that affect hazard mitigation or land use and development.

When the plan is amended or revised, it must be resubmitted through the State as a “plan update” and is subject to a formal review and approval process by our office. If the plan is not updated prior to the required five (5) year update, please ensure that the draft update is submitted at least six (6) months prior to expiration of this plan.

The State and the participants in the Town of Sunset Beach plan should be commended for their close coordination and communications with our office in the review and subsequent approval of the plan. If you or Town of Sunset Beach have any questions or need any additional information please do not hesitate to contact Victor Geer, of the Hazard Mitigation Assistance Branch, at (770) 220-5659, or Linda L. Byers of my staff at (770)-220-5498.

Sincerely,

A handwritten signature in black ink, appearing to read "Robert E. Lowe", with a long horizontal flourish extending to the right.

Robert E. Lowe, Chief
Risk Analysis Branch
Mitigation Division



Hazard Mitigation Plan

Adopted by the Sunset Beach Town Council: April 4, 2011
Approved by the Federal Emergency Management Agency: July 15, 2011

Prepared By:

HCP
Holland Consulting Planners, Inc.

Wilmington, North Carolina

TABLE OF CONTENTS

	<u>PAGE</u>
SECTION 1. INTRODUCTION AND PLANNING PROCESS	
A. Introduction	1-1
B. Statement of the Problem	1-1
C. Hazard Mitigation Legislation	1-2
D. Town of Sunset Beach Hazard Mitigation Plan	1-2
E. Plan Organization	1-3
F. Incorporation of Existing Plans, Studies, and Reports	1-6
G. Planning Process	1-6
SECTION 2. COMMUNITY PROFILE	
A. Location and General Topography	2-1
B. History	2-1
C. Climate	2-1
D. Demographic Summary	2-2
1. Permanent Population	2-2
2. Seasonal Population	2-2
3. Population Profile - Age	2-3
4. Housing	2-4
5. Economy	2-4
SECTION 3. HAZARD IDENTIFICATION	
A. Introduction	3-1
B. Wildfire	3-2
C. Flooding	3-3
D. Hurricanes/Coastal Storms	3-5
1. Tropical Storm Ernesto	3-8
2. Tropical Storm Hanna	3-8
3. Retired Names	3-8
E. Coastal Erosion/Storm Surge	3-9
F. Rip Currents	3-10
G. Winter Storms/Freezes	3-10
H. Thunderstorms and Tornadoes	3-11
I. Lightning	3-13
J. Dam/Levee Failure	3-14
K. Droughts	3-15
L. Earthquakes	3-17
M. Sinkholes	3-19
N. Tsunamis	3-19
O. Ranking of Natural Hazard Potential	3-21
P. Hazard Damage and Likelihood of Occurrence Summary	3-22
SECTION 4. CAPABILITY ASSESSMENT	
A. Institutional Capability	4-1
B. Planning and Ordinance Review	4-3
1. Floodplain Damage Prevention Ordinance	4-3
2. North Carolina State Building Code	4-3

3.	Zoning Ordinance	4-4
4.	Subdivision Ordinance	4-6
5.	Community Rating System	4-7
6.	Preparedness and Response Plans	4-8
	a. Hurricane Response Plan	4-8
	b. Re-entry Policy	4-8
7.	Brunswick County Emergency Operations Plan	4-8
8.	Coastal Area Management Act (CAMA) Land Use Plan	4-9
9.	Town of Sunset Beach Stormwater Management Ordinance	4-10
C.	Legal Capability	4-10
	1. Regulations	4-11
	a. General Police Power	4-11
	b. Building Code and Building Inspections	4-11
	c. Land Use	4-12
	2. Acquisition	4-13
	3. Taxation	4-14
	4. Spending	4-14
D.	Fiscal Capability	4-15
E.	Political Capability	4-16
F.	Technical Capability	4-16

SECTION 5. VULNERABILITY ANALYSIS

A.	Introduction	5-1
B.	Existing Development Patterns	5-1
C.	Vulnerability Analysis Results	5-1
	1. Hazards Impacting the Town Overall	5-1
	a. Existing Vulnerability	5-2
	b. Future Vulnerability	5-3
	c. Estimated Impact of Residential Development	5-4
	2. Flooding	5-5
	Flood Insurance Rate Maps (Firm)	5-6
	a. Existing Vulnerability	5-6
	b. Future Vulnerability	5-7
	c. Estimated Impact of Residential Development	5-7
	SLOSH Model	5-7
	3. Drought	5-8
D.	Fragile Areas	5-8
	1. Estuarine and Ocean System	5-8
	a. Estuarine Water	5-8
	b. Estuarine Shoreline	5-9
	c. Coastal Wetlands	5-9
	d. Public Trust Areas	5-9
	2. Ocean Hazard System	5-10
	a. Ocean Erodible Area	5-10
	b. High Hazard Flood Area	5-11
	c. Unvegetated Beach Area	5-11
E.	Critical Facilities	5-11
F.	Repetitive Loss and Severe Repetitive Loss Structures	5-12

SECTION 6. MITIGATION STRATEGIES

A. Introduction 6-1
 B. Mitigation Progress Report 6-2
 1. Public Participation 6-2
 2. Monitoring and Evaluation 6-2
 3. Mitigation Strategy Progress 6-3
 C. Mitigation Strategies 6-5

SECTION 7. PLAN IMPLEMENTATION AND MAINTENANCE

A. Introduction 7-1
 B. Implementation 7-1
 C. Role of the Mitigation Advisory Committee in Implementation and Maintenance . . . 7-2
 D. Evaluation, Monitoring, and Updating 7-2
 E. Continued Public Involvement 7-3
 F. Incorporation of Existing Planning Mechanisms 7-4

TABLES

Table1 Monthly Temperature and Precipitation Averages for Sunset Beach 2-2
 Table 2 Town of Sunset Beach Population, 1990 to 2008 2-2
 Table 3 Town of Sunset Beach Age Composition, 1990 and 2000 2-3
 Table 4 Town of Sunset Beach Housing Units, 2000 2-4
 Table 5 Town of Sunset Beach Workers by Industry 2-4
 Table 6 Brunswick County Acres of Timberland by Ownership Class 3-2
 Table 7 Hurricanes Affecting Brunswick County, 1996-2003 3-7
 Table 8 Brunswick County Severe Winter Storms, 1993-2010 3-11
 Table 9 Enhanced Fujita Tornado Scale 3-12
 Table 10 Brunswick County Lightning Storms, 1993-2009 3-14
 Table 11 Dams in or Affecting Brunswick County 3-15
 Table 12 Modified Mercalli Scale of Earthquake Intensity 3-17
 Table 13 Town of Sunset Beach/Brunswick County Ranking of Hazard Potential 3-21
 Table 14 Town of Sunset Beach Hazard Impact 3-22
 Table 15 Sunset Beach Community Capability Assessment Summary 4-17
 Table 16 Sunset Beach Existing Land Use 5-3
 Table 17 Sunset Beach Vacant Land by Zoning District 5-4
 Table 18 Sunset Beach Flood Zones 5-6
 Table 19 Sunset Beach Floodprone Structures 5-6
 Table 20 Sunset Beach Vacant Zoning in Floodplain 5-7
 Table 21 Town of Sunset Beach Critical Facilities 5-11
 Table 22 Town of Sunset Beach Mitigation Strategies 6-8

APPENDICES

Appendix A	Maps
Appendix B	MAC Meeting Documentation
Appendix C	NCEM Comments
Appendix D	Public Hearing Documentation/Adoption Resolution
Appendix E	Hazard Inventory
Appendix F	MAC Ranking
Appendix G	Funding Sources

SECTION 1. INTRODUCTION AND PLANNING PROCESS

A. Introduction

When a major natural event strikes our built environment, it is deemed a “natural disaster.” Hazard mitigation is simply about preventing natural disasters. The idea of preventing natural disasters at first seems counter-intuitive, if not impossible. We certainly cannot prevent natural events, like hurricanes and tornadoes. Yet the impacts of natural events – who and what gets hurt – are largely determined by what, where, and how we build and function. Thus, some impacts of natural hazards on our population and economic, social, and physical environment are, in the bigger picture, self-inflicted. As citizens and local government entities, we have not inherited a perfectly planned and resilient community. Due to this fact, we must assess current vulnerabilities resulting from past decisions with regard to development design and location in an effort to reduce the harmful impacts of natural, and in some cases, man-made hazards.

The North Carolina Statewide Plan summarizes hazard mitigation as follows:

“Hazard mitigation involves the use of specific measures to reduce the impact of hazards on people and the built environment. Measures may include both structural and non-structural techniques, such as protecting buildings and infrastructure from the forces of nature or wise floodplain management practices. Actions may be taken to protect both existing and/or future development. It is widely accepted that the most effective mitigation measures are implemented before an event at the local government level, where decisions on the regulation and control of development are ultimately made.”

B. Statement of the Problem

The Town of Sunset Beach is located in the southeastern portion of Brunswick County in the southeastern coastal plains of North Carolina. The town is unique in that roughly 40% of the town is located on a barrier island while the other 60% is located on the mainland. Due to its proximity to the coast, the town is susceptible to flooding, hurricanes, and nor'easters. In addition, the town is vulnerable to severe winter weather/ice storms, severe weather/thunderstorms, tornadoes, hail, lightning, and droughts/heat waves. This Hazard Mitigation Plan (HMP) update also includes a discussion of earthquakes, tsunamis, and rip currents, and how these hazards may potentially impact the Town. Sunset Beach has many plans and ordinances that support mitigation efforts that are used in day-to-day activities. These documents have been instrumental in the development of this update. The town has a competent staff to oversee these ordinances.

The Town drafted and adopted an initial Hazard Mitigation Plan in 2006 in order to establish compliance with the State and Federal regulations outlined below. **The planning process outlined within this document will serve as the required update to the 2006 Hazard Mitigation Plan.** This HMP update will ensure compliance with all State and Federal mitigation legislation through February of 2016. The Town will aim to establish an effective and worthwhile mitigation work program over this period.

C. Hazard Mitigation Legislation

In the early 1990s, a new federal policy regarding disasters began to evolve. Rather than simply reacting whenever disasters strike communities, the federal government would encourage communities to first assess their vulnerability to various disasters, and then take actions to reduce or eliminate potential risks. The logic is simply that a disaster resistant community can rebound from a natural disaster with less loss of property or human injury, at much lower cost, and consequently more quickly. Moreover other costs associated with disasters, such as the time lost from productive activity by business and industries, are minimized.

The Robert T. Stafford Disaster Relief and Emergency Assistance Act (Pub. Law 93-288, as amended) embodies this new philosophy. Section 409 of the Stafford Act sets forth the requirements that communities evaluate natural hazards within their respective jurisdictions and develop an appropriate plan of action to mitigate those hazards.

The amended Stafford Act requires that the community identify potential hazards to the health, safety, and well being of its residents and identify and prioritize actions that can be taken by the community to mitigate those hazards—before disaster strikes. For communities to remain eligible for hazard mitigation assistance from the federal government, they must first prepare a hazard mitigation plan (this plan).

Responsibility for fulfilling the requirements of Section 409 of the Stafford Act and administering the FEMA Hazard Mitigation Program, as outlined in the Code of Federal Regulations (44 CFR 206.405), has been delegated to the State of North Carolina, specifically to North Carolina Emergency Management. The State of North Carolina established legislation through Senate Bill 300 that outlines the need for communities to adopt and maintain a certified mitigation plan. At the state level, local governments must maintain a current plan in order to be eligible for state public assistance funding following a state declared disaster situation.

The Disaster Mitigation Act of 2000 (DMA 2K) amended the Robert T. Stafford Disaster Relief and Emergency Assistance Act (the Act) by repealing the previous mitigation planning provisions (Section 409) and replacing them with a new set of mitigation plan requirements (Section 322). This new section emphasizes the need for state, Tribal, and local entities to closely coordinate mitigation planning and implementation efforts.

D. Town of Sunset Beach Hazard Mitigation Plan

Hazard mitigation offers the following benefits to the Town of Sunset Beach, and the HMP is being completed to attain the following goals:

- Saving lives and reducing injuries;
- Preventing or reducing property damage;
- Reducing economic losses;

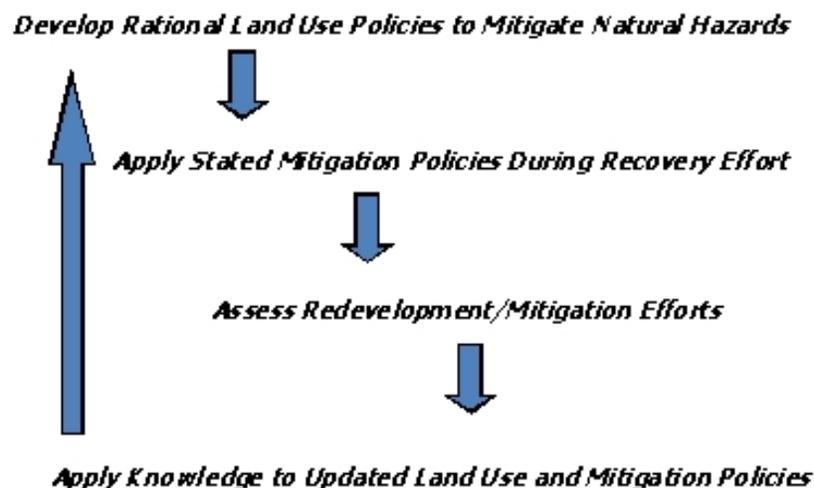
- Minimizing social dislocation and stress;
- Maintaining critical facilities in functional order;
- Protecting infrastructure from damage;
- Protecting mental health;
- Limiting legal liability of government and public officials;
- Providing options for political leaders regarding hazard reduction;
- Fulfilling Federal and State requirements for receipt of future disaster recovery and hazard mitigation assistance; and
- Improve inter-jurisdictional cooperation and coordination, especially regarding the reduction of natural hazard impacts.

Hazard mitigation planning is intended to construct a framework for the prevention and reaction to disasters if and when they may occur. The framework created by this plan will help to instill an ongoing effort to lessen the impact that disasters have on citizens and property within the Town of Sunset Beach. The above-listed items are but only a few of the many complex issues that the formulation of such a process will ultimately address.

Through this planning effort, the Town will work to define strategies that focus on reducing the vulnerability of Town facilities and resources to natural and man-made disasters, in response to the federal regulations outlined above. Goals, objectives, and accompanying implementing strategies will focus on strengthening existing and future infrastructure, facilities, and development. Additionally, through the planning process, the Mitigation Advisory Committee (MAC) will review existing administrative systems to ensure that proper mechanisms are in place to provide adequate response and facilitate public assistance funding in the event of a natural disaster.

E. Plan Organization

The planning process for the update of the Sunset Beach Hazard Mitigation Plan involved a comprehensive review of all components of the existing document. The Mitigation Advisory Committee subscribed to the following strategic planning model:



Through the employment of this model, the MAC reviewed all efforts carried out since the adoption of the 2006 plan and decided whether these efforts proved effective based on a current risk assessment, prior occurrences of inclement weather activity, and the current political and budgetary climate. Through these discussions, revised strategies were developed based on the following factors:

- The strategy will improve upon the Town of Sunset Beach's participation and role in the National Flood Insurance Program; and
- The policy meets at least one community mitigation goal; and
- The policy complies with all laws and regulations; and
- The policy is cost-beneficial; and
- The community implementing the policy has (or will have) the capability to do so; and
- The policy is environmentally sound; and
- The policy is technically feasible.

The Town of Sunset Beach Hazard Mitigation Plan includes the following sections and appendices:

Section 1 - Introduction and Planning Process: This section includes an overview of the plan process and purpose. This section also provides a justification for why the plan is being developed, and what the Town intends to achieve through carrying out the development and implementation of the document.

Additionally, this section contains a description of the plan methodology and development process, a list of participating members of the planning group, summary of planning group activities, description of involved stakeholders including state and local agencies and public participants, a list of stakeholder and public involvement efforts, and a description of how this plan will be incorporated into existing programs.

Section 2 - Community Profile: This section outlines the existing conditions within the Town of Sunset Beach. This overview addresses the following existing conditions: demographics, topography, climate, and other general information regarding the community. The information presented in this section was reviewed by the MAC and all data was updated to reflect 2010 conditions.

Section 3 - Hazard Identification: This section provides a breakdown of hazards that have historically impacted the Town of Sunset Beach. This section also includes a discussion of anticipated effects and impacts resulting from each identified hazard. During the update process, the MAC reviewed all hazards to ensure whether they still pose a threat to the town. Additionally, this section was updated to reflect occurrences of each natural hazard type since adoption of the 2006 plan.

Section 4 - Capability Assessment: This section of the HMP provides an assessment of the Town's current hazard mitigation practices, as well as their potential to engage in mitigation activities. This involves a discussion of the existing plans, codes and ordinances, and administrative mechanisms currently utilized. The capability assessment has been reviewed by the MAC as part of the comprehensive update process. This effort involved the updating of information relating to: administrative capabilities, infrastructure resources, land development controls, and existing local and state policy programs.

Section 5 - Vulnerability Analysis: This section presents the vulnerability assessment, which includes (1) an inventory of assets, (2) loss estimates, (3) evaluation of the potential impact of development trends, and (4) results of the analysis. As a component of the mitigation plan update, the vulnerability analysis was updated to reflect the 2010 development characteristics within the Town of Sunset Beach. In addition, the critical facilities list was reviewed and updated by the MAC.

Section 6 - Mitigation Strategies: This section contains information regarding the mitigation goals and multi-hazard mitigation action items. Section 6 also includes information regarding how mitigation measures will be prioritized, implemented, and administered. The MAC undertook a comprehensive review of the mitigation strategies outlined within the 2006 plan. This review led to the modification of all existing mitigation strategy statements as reflected in Section 6 of the plan update. Through this effort, the Town is attempting to strengthen their existing mitigation program. The MAC feels that the revised statements are more effective and appropriately define how mitigation initiatives outlined in the plan should be carried out. Please note that the overhaul of the 2006 policies makes it difficult to cross reference the updated strategies with those outlined in the 2006 plan.

Section 7 - Plan Maintenance and Implementation Procedures: This section describes the system the Town of Sunset Beach has established to monitor the mitigation plan; provides a description of how, when, and by whom the mitigation plan and mitigation actions will be evaluated; presents the criteria used to evaluate the plan and mitigation actions; and explains how the plan will be maintained and updated. This section was completely redrafted to reflect current conditions.

Appendices: These sections present supporting documentation as outlined within the plan. NOTE: All maps referenced throughout the HMP update are included in Appendix A.

F. Incorporation of Existing Plans, Studies, and Reports

Sunset Beach utilized several existing policy and regulatory documents to assist in the preparation of the Hazard Mitigation Plan Update. Information from the Town’s land use plan, zoning ordinance and flood damage prevention ordinance were instrumental in compiling information presented in this update. Additionally, the land use plan, in conjunction with the flood damage prevention ordinance and zoning ordinance, provided the Town with the tools to conduct a vulnerability assessment. Through implementation of this plan, the Town will continue to reference these documents in an effort to carry out an effective mitigation program.

G. Planning Process

The Town of Sunset Beach appropriated funding within their FY2010/2011 annual budget to complete the Hazard Mitigation Plan Update. The Town selected a qualified firm, and the Town of Sunset Beach initiated the hazard mitigation planning process.

Primary responsibility for development of the Town of Sunset Beach Hazard Mitigation Plan Update was placed in the hands of the Sunset Beach Building Inspections and Zoning Department under the direction of Chief Building Inspector Jeff Curtis. Mr. Curtis worked closely with all Town departments throughout the planning process to develop this document.

Subsequent to establishing a work authorization with the planning consultant, the Town of Sunset Beach held an initial scoping meeting with the project consultant. This meeting involved a general discussion of how the project should be carried out, including issues relating to establishing a Mitigation Advisory Committee (MAC) to oversee the update. It was determined that the MAC would be comprised solely of administrative officials from the Town.

Dealing with natural hazards and disasters is rarely the responsibility of one employee or official in any community. Rather, it is a team effort, often comprised of representatives from Town management and administration, planning/zoning, public works, fire/police, and other offices.

The Town convened the MAC in order to efficiently address this "multi-disciplinary" aspect of hazard mitigation. MAC members were charged with the responsibility of working through the planning process, and assisting the consultant with compiling the information, input, and background required to develop the plan.

The following outlines all individuals assigned to the MAC, and their related area of expertise in relation to the overall project:

<u>MAC Members</u>	<u>Area of Expertise</u>
Gary Parker	Town Administration
Jeff Curtis	Building Inspections/Zoning
Randy Walters	Building Inspections

<u>MAC Members</u>	<u>Area of Expertise</u>
Lisa H. Massey	Police Protection
Chris Barbee	Fire Protection, Emergency Management

A series of meetings were held to develop the Hazard Mitigation Plan Update, each focusing on a specific aspect of the planning process. A total of four MAC meetings were held, and several additional meetings took place between staff and various interests involving plan development. The following provides a brief summary of all meetings held and what was addressed at each meeting:

- **June 3, 2010:** MAC representatives involving Town staff convened for a scoping and overview meeting with the consultant. This meeting focused on the planning process, and what the Town should aim to get achieve in working through the development of a Hazard Mitigation Plan Update.
- **June 30, 2010:** The agenda for the second MAC meeting focused on a discussion aimed at reviewing critical/community facilities and the goals, policies, and implementing actions within the Town's existing document. Committee members were provided with these sections of the existing plan, and a discussion of each mitigation action ensued. The intent of this discussion was to determine what has been accomplished over the last five years with respect to the mitigation policy in the 2006 update. This discussion also involved making a determination as to whether the 2006 policies and mitigation actions were still applicable, which served as the basis for the development of updated goals, objectives, and mitigation strategies.
- **July 2010:** At the third MAC meeting, draft mitigation objectives and implementing actions were presented. These action statements were reviewed, and primary and secondary responsibility was assigned. Time frames have been assigned to each implementing action based on the perceived difficulty of carrying out a given activity. The results of this effort have been directly translated into the policy section of the document.

On July 21, 2010, a public input and information meeting was held to provide an overview of the draft plan and provide the public with an opportunity to comment on the strategies that had been developed by the MAC. The meeting was held in the Town Council Chambers at the Sunset Beach Administration Building. This meeting was conducted as an open house with ample opportunity for questions and input from the citizens. The meeting was widely advertised through local media outlets in order to generate interest and input from the general public, neighboring communities, and academia. Several citizens did attend the meeting; however, there were no comments made. Following a presentation, questions were addressed and the public was informed of the remaining steps in the process.

- **August 11, 2010:** The fourth MAC meeting was held to discuss the final mitigation strategies to be incorporated into the update. Subsequent to this date, a draft plan was completed and disseminated to the MAC. Also at this meeting, a review period was established to allow adequate time for Town, regional agencies, and NCEM review and comment.
- **April 4, 2011:** A public hearing was advertised and scheduled to review the final draft plan. This meeting focused on providing the public with an overview of the planning process, as well as the strategies outlined within the document.

Sign-in sheets for all meetings and copies of the advertisements for all publicly advertised meetings have been provided in Appendix B.

A draft version of the plan was completed on September 3, 2010, and distributed to MAC members and representatives of the following stakeholder offices/organizations for review and comment. No comments were received from any of the reviewing agencies.

- Administrative offices of New Hanover, Pender, and Columbus counties
- Brunswick County Emergency Management Department
- North Carolina Department of Transportation
- American Red Cross
- North Carolina Division of Coastal Management
- Brunswick County Administrative Office

Review comments were received from NCEM on October 14, 2010, and revisions were made to the final draft HMP based on these NCEM comments (see Appendix C). The final draft HMP was resubmitted to NCEM on November 9, 2010.

Following receipt of a final letter of approval from NCEM/FEMA, the HMP was forwarded to the Town of Sunset Beach Town Council for adoption. Prior to adoption, however, a final public hearing was held in order to allow the public and the above-identified stakeholder groups the opportunity to make comments on and provide input to the final plan. The affidavit of publication for the public hearing notice and adoption resolution from this meeting have been provided as Appendix D. The Sunset Beach Town Council adopted the Hazard Mitigation Plan Update on April 4, 2011. The adopted HMP received FEMA approval on July 15, 2011.

SECTION 2. COMMUNITY PROFILE

A. Location and General Topography

Sunset Beach is located within the chain of barrier islands along North Carolina's southeastern coast. The town occupies the smallest and most southern of three barrier islands which together make up the South Brunswick Islands. The island upon which Sunset Beach is situated is bordered by Long Bay, Tubbs Inlet, New River Inlet (SC), and the Intracoastal Waterway. Significant urban centers and their proximity to Sunset Beach are listed below:

- Wilmington, North Carolina – 40 miles to the northeast
- Raleigh, North Carolina – 220 miles to the north
- Myrtle Beach, South Carolina – 30 miles to the southwest

The corporate limits of the town encompass not only the barrier island but also a small portion of the mainland. The area in and around Sunset Beach consists of wide sandy beach, dunes, waterways, sound, creeks, tidal flats, and marshlands. See Map 1 (Appendix A) for regional location.

B. History

Formerly known as Bald Beach, Sunset Beach was purchased in 1955 by Mannon C. Gore from the Brooks family, which dates its ownership back to the 1700's. Mannon Gore was a farmer by trade, but he also possessed skills in the bridge building and dredging business. Mr. Gore designed and built the causeway and the first pontoon swing bridge onto the island. He also built the original Vesta Pier on the island, named after a civil war blockade runner which ran aground on January 10, 1864, and is now buried beside the present Sunset Beach pier.

Sales of property on Sunset Beach began in 1958. Edward M. Gore, Sr., Mannon Gore's son, joined the business in the late 1950's. Together they helped develop the island into a quiet but thriving community.

C. Climate

The Town of Sunset Beach has an average high temperature of 74.9° F., an average low temperature of 51.3° F., and an annual average temperature of 63.2° F. Table 1 summarizes average monthly temperatures and precipitation for Sunset Beach.

Table 1. Monthly Temperature and Precipitation Averages for Sunset Beach

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Avg. Maximum Temperature	59.7°	55.6°	69.8°	72.8°	79.8°	85.4°	87.6°	91.4°	85.5°	79.8°	66.7°	64.8°
Avg. Minimum Temperature	37.8°	30.1°	41.2°	44.6°	54.3°	64.8°	68.5°	71.6°	64.6°	59.0°	40.6°	38.7°
Average Precipitation	4.39"	2.25"	1.94"	2.55"	2.30"	3.46"	4.02"	3.25"	1.64"	6.98"	0.02"	3.44"

Source: National Weather Service.

The maximum average precipitation occurs in October, with 6.98 inches. The town receives approximately 36.24 inches of precipitation annually.

D. Demographic Summary

1. Permanent Population

The Town of Sunset Beach experienced a sizeable 486.5% increase in its permanent population from 1990 to 2000. Although the town's population increased less dramatically (by 86.2%) from 2000 to the 2008 NC Office of State Planning's estimate, the overall 1990 to 2008 growth trend was significant – the 2008 estimated population was 10 times the 1990 population. This dramatic increase was most likely the result of an expansion of the Town's corporate limits.

Table 2. Town of Sunset Beach Population, 1990 to 2008

Total Population			% Change		
1990	2000	2008 Estimate	'90-'00	'00-'08	Overall '90-'08
311	1,824	3396	486.5%	86.2%	992.0%

Source: US Census Bureau & NC Office of State Planning.

2. Seasonal Population

The following provides the peak seasonal population as reported in the Town of Sunset Beach CAMA Land Use Plan. For a detailed explanation of how these figures were derived, refer to Section 3.1.1 of the CAMA Land Use Plan.

Seasonal Estimate by Housing Unit. According to Census data, there were approximately 2,000 vacant units categorized as seasonal use in the year 2000. Census 2000 also shows that around 60% of the total housing in Town has been used for seasonal use. Since Census 2000, there have been 828 total housing units built. If it is assumed that the 60% ratio for seasonal housing continues, it can be assumed that 60% of the 828 new housing units, or 497 housing units, will be used for seasonal use. The 2,000 already existing seasonal units

plus 497 new units equals approximately 2,500 units for seasonal use today. To try and account for variation in the number of persons per unit, it will be assumed that 50% of the seasonal units have 3 persons and 50% have 6 persons. In addition, a low seasonal estimate will be derived by assuming occupancy of only 75% of the seasonal units. A high seasonal estimate will be derived by assuming 100% occupancy of the seasonal units. The permanent population has been estimated to be 2,219 for 2006.

High Estimate (100% Occupancy)

$[1,250 \text{ units} \times 3 \text{ persons}] + [1,250 \text{ units} \times 6 \text{ persons}] = 11,000 \text{ seasonal population}$
 $11,000 \text{ seasonal} + 2,219 \text{ permanent} = 13,219 \text{ peak population}$

Low Estimate (75% Occupancy)

$[(1,250 \times .75) \times 3 \text{ persons}] + [(1,250 \times .75) \times 6 \text{ persons}] = 8,437 \text{ seasonal population}$
 $8,437 \text{ seasonal} + 2,219 \text{ permanent} = 10,656 \text{ peak population}$

3. Population Profile - Age

The majority (34.7%) of the residents of Sunset Beach are retired (aged 65 and over), as reported in the 2000 US Census. The next largest age bracket, at 29.1% of the total, is the 55 to 64 year age group. The retired population increased from 24.2% of the total in 1990 to 34.7% of the total in 2000. Table 3 provides a detailed breakdown of age composition for the Town.

Table 3. Town of Sunset Beach Age Composition, 1990 and 2000

Age	1990		2000	
	Total	% of Total	Total	% of Total
0 to 14 years	30	9.6%	100	5.5%
15 to 34 years	47	15.1%	145	8.0%
35 to 54 years	103	33.1%	416	22.8%
55 to 64 years	66	21.2%	530	29.1%
65 to 74 years	52	16.7%	440	24.1%
75 and over	13	4.2%	193	10.6%
Total population	311	100.0%	1,824	100.0%
Median age	52.5	N/A	37.1	N/A

Source: US Census Bureau.

4. Housing

As is typical for beach communities, the total number of vacant housing units outnumber the occupied units, due to the seasonal nature of the occupancy rate. As reported in the 2000 US Census, the number of vacant units used for seasonal, recreational, or occasional use (1,824) is more than double the total number of occupied units (909). Table 4 summarizes housing tenure of residential units within the Town of Sunset Beach.

Table 4. Town of Sunset Beach Housing Units, 2000

	Number	Percentage
Occupied Housing Units	909	30.5%
Owner Occupied	821	27.5%
Renter Occupied	88	3.0%
Vacant Housing Units	2,074	69.5%
Vacant for Seasonal, Recreational, or Occasional Use	1,824	61.1%
Vacant for Other Reasons	250	8.4%
Total Housing Units	2,983	100.0%

Source: US Census Bureau.

According to the US Census, there were 1,943 housing units in the town as of 1990. Since that time, there has been an increase in the town's housing stock. The 2000 Census reported 2,983 units in the town, an increase of 1,040 units, or 53%.

5. Economy

The following provides a brief summary of significant economic factors for the Town of Sunset Beach. Not surprisingly, the accommodation and food services industry employs the majority of the civilian population 16 years and over in Sunset Beach. The next significant industry employing Sunset Beach workers is the retail trade industry. Table 5 lists the major industries employing Sunset Beach workers as of the 2000 US Census.

Table 5. Town of Sunset Beach Workers by Industry

Industry	# of Workers	% of Workers
Agriculture, forestry, fishing and hunting, and mining	-	-
Construction	62	10.0%
Manufacturing	21	3.4%
Wholesale trade	18	2.9%
Retail trade	107	17.2%
Transportation and warehousing, and utilities	19	3.1%

Industry	# of Workers	% of Workers
Information	16	2.6%
Finance, insurance, real estate, and rental and leasing	68	11.0%
Professional, scientific, management, administrative, and waste management services	78	12.6%
Educational, health and social services	59	9.5%
Arts, entertainment, recreation, accommodation and food services	114	18.4%
Other services (except public administration)	40	6.4%
Public administration	18	2.9%

Source: US Census Bureau.

The Town of Sunset Beach maintains a median income that is slightly higher than the nearby City of Wilmington and the state's capital city, Raleigh. The median income for Sunset Beach residents according to the 2000 US Census was \$47,356, while the cities of Wilmington and Raleigh had median incomes of \$31,099 and \$46,612, respectively.

The local economy remains dependent upon seasonal tourism, recreation, and housing rental activity for generating the bulk of economic revenue for the town. Major employers in Sunset Beach include hotels/inns, real estate sales and rental agencies, restaurants, and retail shops.

SECTION 3. HAZARD IDENTIFICATION

A. Introduction

This section of the Hazard Mitigation Plan Update identifies and analyzes the hazards facing the Town of Sunset Beach, as well as Brunswick County. This approach was taken because most of the data available is reported at the County level, and because a number of these natural hazards can impact portions of the Town in conjunction with unincorporated portions of the County.

This section aims to address the following questions:

- What are the *types* of natural hazards that threaten the community?
- What are the *characteristics* of each hazard?
- What is the *likelihood* of occurrence (or probability) of each hazard?
- What is the likely *magnitude* of the potential hazards?
- What are the possible *impacts* of the hazards on the community?

The following section identifies each natural hazard that poses an elevated threat to the Town of Sunset Beach. A rating system is provided that addresses the potential for occurrence for each identified threat (see Table 13). The following natural hazards were determined to be of concern for the Town of Sunset Beach:

1. Wildfires/Urban Fires
2. Flooding
3. Hurricanes/Coastal Storms
4. Coastal Erosion/Storm Surge
5. Rip Currents
6. Winter Storm/Freezes
7. Thunderstorms and Tornadoes
8. Lightning
9. Dam/Levee Failure
10. Earthquakes
11. Sinkholes
12. Drought
13. Tsunamis

A detailed explanation of these hazards and how they have impacted Brunswick County/Town of Sunset Beach is provided on the following pages. The weather history summaries provided throughout this discussion have been compiled from the National Oceanic and Atmospheric Administration (NOAA). Data utilized from NOAA was provided through the National Climatic Data Center (NCDC). The NCDC compiles monthly reports that track weather events and any financial or life loss associated with a given occurrence. These reports are compiled and stored in an online database that is organized by state and county for the entire United States. The data presented in this section as well as Appendix E are the results of this research.

B. Wildfire

A wildfire is an uncontrolled burning of grasslands, brush, or woodlands. The potential for wildfire depends upon surface fuel characteristics, recent climate conditions, current meteorological conditions, and fire behavior. Hot, dry summers and dry vegetation increase susceptibility to fire in the fall, a particularly dangerous time of year for wildfire.

While natural fires occur in any area in which there is vegetation, flammability varies by species, moisture content, and is influenced by the climate. Temperate, primarily deciduous forests, such as those in North Carolina, are most vulnerable to fire in autumn, when the foliage dries out. Grasses are least prone to ignition in the morning, when their moisture content is greatest.

Many wildfires have been caused by lightning strikes, however, humans are the greatest cause of wildfires. The progressive expansion of human activities into heavily vegetated areas has not only increased the number of wildfires but also increased the losses to life and property. The majority of fires which threaten life and property have been due to human actions. Main sources of ignition have been agricultural fires, discarded cigarette butts, and campfires which have gotten out of control.

According to *Forest Statistics for North Carolina, 2002*, published by the North Carolina Division of Forest Resources, 422,000 acres of Brunswick County's total acreage of 529,700 acres are in forestland. This represents approximately 79.7% of the County's land area. Overall, 254,500 acres of the total 422,000 acres of forestlands in the County (approximately 60%) are in private ownership and as such are quite susceptible to development. Table 6 provides acres of timberland by ownership class.

Table 6. Brunswick County Acres of Timberland by Ownership Class

All Ownership	National Forest	Miscellaneous Federal	State	County and Municipal	Forest Industry	Private Ownership
422,000	—	10,400	—	—	157,100	254,500

Source: Forest Statistics for North Carolina, 2002.

Annually, wildfires erupt throughout the region. On average, for the period between 2004 and 2008, Brunswick County experienced 84 wildfires per year. Debris fires and incendiary (i.e., intentionally lit) fires accounted for almost three quarters of annual fires during this period (62 per year). As population densities spread out into areas surrounding the forest land, citizens and private property increasingly become more susceptible to the effects of wildfires. While the incorporated government jurisdictions in Brunswick County (such as Sunset Beach) have significantly less forest land within their corporate limits and extraterritorial jurisdictions (ETJs) than in the unincorporated County, the municipal governments' boundaries exist at the "urban/wildland interface" – the area where human development meets undeveloped, forested areas that provide fuel for fires. This "urban/wildland interface" presents the greatest risk to life and property from wildfires.

While there have been no incidences of wildfires within Sunset Beach, they pose a natural fire hazard to the Town in the area adjoining Old Georgetown Road. This area is covered by dense forest vegetation and significant undergrowth. In addition, some of the area is not easily accessible to emergency equipment. It is within these areas that the fire hazard is greatest. Development near the edge of these areas creates an ever-growing risk of damaging fires. The area is outside the Town's municipal limits and fire service area; however, the threat to these areas is a concern for the Town of Sunset Beach. Like other natural phenomenon, jurisdictional boundaries are irrelevant in the event of a wildfire. In addition to concern regarding property within the Sunset Beach fire district, a mutual aid agreement with Calabash obligates the Town to assist with fire-fighting efforts in this area. The probability of wildfires occurring in Sunset Beach is possible (see Table 14).

C. Flooding

Flooding is a localized hazard that is generally the result of excessive precipitation. However, in coastal areas, storm surge and wind-driven waves are significant components of flooding. Floods can be generally considered in two categories: flash floods, the product of heavy localized precipitation in a short time period over a given location; and general floods, caused by precipitation over a longer time period and over a given river basin. Flooding is the most common environmental hazard, due to the widespread geographical distribution of river valleys and coastal areas, and the attraction of residents to these areas.

Flash floods occur within a few minutes or hours of heavy amounts of rainfall or from a dam or levee failure. Flash floods can destroy buildings and bridges, uproot trees, and scour out new drainage channels. Heavy rains that produce flash floods can also trigger mudslides. Most flash flooding is caused by slow-moving thunderstorms, repeated thunderstorms in a local area, or by heavy rains from hurricanes and tropical storms. Although flash flooding occurs often along mountain streams, it is also common in urban areas where much of the ground is covered by impervious surfaces.

The severity of a flooding event is determined by a combination of river basin physiography, local thunderstorm movement, past soil moisture conditions, and the degree of vegetative clearing. Abnormal weather patterns may also contribute to flooding of a local area. Large-scale climatic events, such as the El Nino-Southern Oscillation in the Pacific have been linked to increased storm activity and flooding in the United States. Nationally, July is the month in which most flash flooding events occur, and nearly 90% of flash floods occur during the April through September period.

While flash floods occur within hours of a rain event, general flooding is a longer-term event, and may last for several days. The primary types of flooding are riverine flooding, coastal flooding, and urban flooding.

Periodic flooding of lands adjacent to non-tidal rivers and streams is a natural and inevitable occurrence. When stream flow exceeds the capacity of the normal water course, some of the

above-normal stream flow spills over onto adjacent lands within the floodplain. Riverine flooding is a function of precipitation levels and water runoff volumes within the watershed of the stream or river. The recurrence interval of a flood is defined as the average time interval, in years, expected to take place between the occurrence of a flood of a particular magnitude and an equal or larger flood. Flood magnitude increases with increasing recurrence interval.

Floodplains are divisible into areas expected to be inundated by spillovers from stream flow levels associated with specific flood-return frequencies. The National Flood Insurance Program (NFIP) uses flood hazard zone designations to indicate the magnitude of flood hazards in specific areas. The following are flood hazard zones located within the Town of Sunset Beach and a definition of what each zone means.

- **A** – Areas with a 1% annual chance of flooding and a 26% chance of flooding over the life of a 30-year mortgage.
- **AE** – The base floodplain where base flood elevations are provided.
- **VE** – Coastal areas with a 1% or greater chance of flooding and an additional hazard associated with storm waves. These areas have a 26% chance of flooding over the life of a 30-year mortgage.
- **Shaded X** – Area of moderate flood hazard, usually the area between the limits of the 100-year and 500-year floods.
- **X** – Area determined to be outside the 500-year flood and protected by levee from the 100-year flood.

Coastal flooding is typically a result of storm surge, wind-driven waves, and heavy rainfall. These conditions are produced by hurricanes during the summer and fall, and nor'easters and other large coastal storms during the winter and spring. Storm surges may overrun barrier islands and push sea water up coastal rivers and inlets, blocking the downstream flow of inland runoff. Thousands of acres of crops and forestlands may be inundated by both saltwater and freshwater. Escape routes, particularly from barrier islands, may be cut off quickly, stranding residents in flooded areas and hampering rescue efforts.

Urban flooding occurs where there has been development within floodplains. This occurrence is partly a result of the use of waterways for transportation purposes in earlier times or, as in Sunset Beach's case, the development as a resort area. The price of this accessibility was increased flooding in the ensuing urban areas. Urbanization increases the magnitude and frequency of floods by increasing impermeable surfaces, increasing the speed of drainage collection, reducing the carrying capacity of the land, and occasionally overwhelming sewer systems.

Since 1994, Brunswick County has suffered thirty-two (32) documented flooding events reported to the National Climatic Data Center (NCDC). This list is not exhaustive, but rather represents the best available historical data source on inland flooding and excludes events that were strictly storm surge related (see Appendix E for a full listing of hazard events).

Flood hazard varies by location and type of flooding. Coastal areas are most at risk from flooding caused by hurricanes, tropical storms, and nor'easters. Low-lying coastal areas in close proximity to the shore, sounds, or estuaries are exposed to the threat of flooding from storm surge and wind-driven waves, as well as from intense rainfall. Areas bordering rivers may also be affected by large discharges caused by heavy rainfall over upstream areas.

The greatest threat of flooding for the Town of Sunset Beach is posed by hurricanes. Areas along the Intracoastal Waterway and the areas adjacent to the upper reaches of Calabash Creek are susceptible to flooding due to hurricanes. On occasion, the Town experiences flooding in conjunction with nor'easters, particularly with the combined effects of heavy rainfall accompanying the storms and higher than usual astronomical tides. Based on the geographic location of the Town on the Atlantic Ocean and the Intracoastal Waterway, the probability of flooding occurring in the Town of Sunset Beach is likely (see Table 14).

D. Hurricanes/Coastal Storms

Hurricanes are cyclonic storms that originate in tropical ocean waters poleward of about 5° latitude. Basically, hurricanes are heat engines, fueled by the release of latent heat from the condensation of warm water. Their formation requires a low pressure disturbance, sufficiently warm sea surface temperature, rotational force from the spinning of the Earth, and the absence of wind shear in the lowest 50,000 feet of the atmosphere.

Hurricanes that impact North Carolina form in the so-called Atlantic Basin, from the west coast of Africa westward into the Caribbean Sea and Gulf of Mexico. Hurricanes in this basin generally form between June 1 and November 30, with a peak around mid-September. As a hurricane develops, barometric pressure at its center falls and winds increase. Winds at or exceeding 39 mph result in the formation of a tropical storm, which is given a name and closely monitored by the NOAA National Hurricane Center in Miami, Florida. When winds are at or exceed 74 mph, the tropical storm is deemed a hurricane. Nor'easters share many of the same characteristics of hurricanes, but unlike hurricanes, these storms are extratropical (forming outside of the tropics), deriving their strength from horizontal gradients in temperature. Although nor'easters are more diffuse and less intense than hurricanes, they occur more frequently and cover larger areas and longer coastal reaches at one time. The coastal counties of North Carolina are most vulnerable to the impacts of nor'easters. Since the storms often occur at night, they typically make landfall with less warning than hurricanes, catching residents at home and unprepared. On the other hand, nor'easters typically occur during the off-season when fewer non-residents are visiting the coast. As with hurricanes, vulnerability is proportional to structural strength, with mobile homes particularly vulnerable.

Because hurricanes derive their strength from warm ocean waters, they are generally subject to deterioration once they make landfall. The forward momentum of a hurricane can vary from just a few miles per hour to up to 40 mph. This forward motion, combined with a counterclockwise

surface flow make the right front quadrant of the hurricane the location of the most potentially damaging winds.

Hurricane intensity is measured using the Saffir-Simpson Scale, ranging from 1 (minimal) to 5 (catastrophic). The following scale categorizes hurricane intensity linearly based upon maximum sustained winds, minimum barometric pressure, and storm surge potential.

- **Category 1:** Winds of 74 to 95 miles per hour. Damage primarily to shrubbery, trees, foliage, and unanchored mobile homes. No appreciable wind damage to other structures. Some damage to poorly constructed signs. Storm surge possibly 3 to 5 feet above normal. Low-lying roads inundated, minor pier damage, some small craft in exposed anchorage torn from moorings.
- **Category 2:** Winds of 96 to 110 miles per hour. Considerable damage to shrubbery and tree foliage; some trees blown down. Major damage to exposed mobile homes. Extensive damage to poorly constructed signs. Some damage to roof materials of buildings; some window and door damage. No major wind damage to buildings. Storm surge possibly 6 to 8 feet above normal. Coastal roads and low-lying escape routes inland cut by rising water 2 to 4 hours before arrival of hurricane center. Considerable damage to piers. Marinas flooded. Small craft in unprotected anchorages torn from moorings. Evacuation of some shoreline residences and low-lying island areas required.
- **Category 3:** Winds of 111 to 130 miles per hour. Foliage torn from trees; large trees blown down. Practically all poorly constructed signs blown down. Some damage to roofing materials of buildings; some window and door damage. Some structural damage to small buildings. Mobile homes destroyed. Storm surge possibly 9 to 12 feet above normal. Serious flooding at coast and many smaller structures near coast destroyed; larger structures near coast damage by battering waves and floating debris. Low-lying escape routes inland cut by rising water 3 to 5 hours before hurricane center arrives.
- **Category 4:** Winds of 131 to 155 miles per hour. Shrubs and trees blown down; all signs down. Extensive damage to roofing materials, windows, and doors. Complete failure of roofs on many small residences. Complete destruction of mobile homes. Storm surge possibly 13 to 18 feet above normal. Major damage to lower floors of structures near shore due to flooding and battering by waves and floating debris. Low-lying escape routes inland cut by rising water 3 to 5 hours before hurricane center arrives. Major erosion of beaches.
- **Category 5:** Winds greater than 155 miles per hour. Shrubs and trees blown down; considerable damage to roofs of buildings; all signs down. Very severe and extensive damage to windows and doors. Complete failure of roofs on many

residences and industrial buildings. Extensive shattering of glass in windows and doors. Some complete building failures. Small buildings overturned or blown away. Complete destruction of mobile homes. Storm surge possibly greater than 18 feet above normal. Major damage to lower floors of all structures less than 15 feet above sea level. Low-lying escape routes inland cut by rising water 3 to 5 hours before hurricane center arrives.

North Carolina has had an extensive hurricane history dating back to colonial times. During the nineteenth century, storms occurred in 1837, 1846, 1856, 1879, 1883, and 1899. North Carolina was impacted by several hurricanes during the 1950s, including Hazel, Connie, Diane, and Ione. Between 1960 - 1990, there was a decrease in landfalling hurricanes, with the exception of Hurricane Donna in 1960, Hurricane Ginger in 1971, Hurricane Diana in 1984, and Hurricane Hugo in 1989. Recent history has included several hurricanes as well, with Emily (1993), Opal (1995), Bertha (1996), Fran (1996), Bonnie (1998), Dennis (1999), and Floyd (1999) all leaving their mark on North Carolina. Table 7 provides historical occurrences of storms that directly affected Brunswick County and have had an impact on the Town of Sunset Beach.

Table 7. Hurricanes Affecting Brunswick County, 1996-2003

Storm Name	Date	Deaths	Injuries	Damage	
				Property	Crop
Tropical Storm Arthur	6/18/1996	0	0	0	0
Hurricane Bertha	7/12/1996	0	0	2.0 M	9.0 M
Hurricane Fran	9/5/1996	0	0	5.0 M	2.0 M
Hurricane Bonnie	8/26/1998	0	0	35.0 M	64.0 M
Hurricane Dennis	8/30/1999	0	0	75.0 K	0
Hurricane Floyd	9/15/1999	0	0	109.0 M	4.0 M
Hurricane Isabel	9/18/2003	0	0	0	0
Hurricane Charley	8/14/2004	0	3	10.4 M	2.5 M
Tropical Storm Gaston	8/29/2004	0	0	0	0
Hurricane Ophelia	9/14/2005	0	0	8.3 M	0

Source: National Oceanic and Atmospheric Administration.

North Carolina's geographic location on the Atlantic Ocean and its proximity to the Gulf Stream make it prone to hurricanes. In fact, North Carolina has experienced the fourth greatest number of hurricane landfalls of any state in the twentieth century (trailing Florida, Texas, and Louisiana). The Town of Sunset Beach is located on the southeastern coast of North Carolina. It is surrounded by the Atlantic Ocean and the Intracoastal Waterway. Due to geographic location and historical data, the probability that a hurricane will hit the Town of Sunset Beach in a given calendar year is highly likely (see Table 14). The following provides a brief description of several hurricanes which have had an impact on the Town since adoption of the 2006 Town of Sunset Beach Hazard Mitigation Plan.

1. Tropical Storm Ernesto (August 31 to September 1, 2006)

Tropical Storm Ernesto made landfall on the eastern coast of Brunswick County near 10:30 pm EST on August 31st. The maximum wind speed was recorded at Wrightsville Beach at 74 mph. A 66 mph wind gusts was recorded at Kure Beach and at Bald Head Island the peak wind was 65 mph. Thousands of residents lost power at the height of the storm. During the early morning hours Ernesto moved north, and tropical storm warnings were lowered for southeast North Carolina at 7:00 am EST, September 1st. Most of the property damage was due to rainfall and freshwater flooding, with little structural damage from wind. Many roads in Brunswick County were impassable.

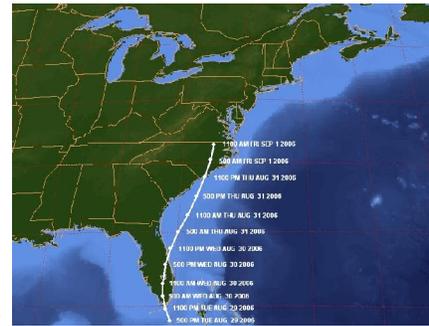


Figure 1. Tropical Storm Ernesto
Source: National Weather Service.

Rainfall storm totals ranged from 4.5 inches in Columbus County to nearly 12 inches along the coast of Pender County. Along the coast, storm surge was less than 3 feet. Beach erosion was minor to moderate, with some dune loss mainly at Topsail Island.

2. Tropical Storm Hanna (August 28 to September 7, 2008)

Tropical Storm Hanna came ashore near the NC/SC border, with winds over 50 mph and heavy rain. Rainfall amounts across the region ranged from four to six inches. The highest recorded gust was 72 mph at Johnny Mercer Pier, however most of the recorded wind gusts were around 50 mph. The saturated soil contributed to numerous downed trees.



Figure 2. Tropical Storm Hanna
Source: NOAA.

3. Retired Names

Some hurricanes are so significant and have such a great impact on an area that the names are retired. The name of a hurricane may be retired if the country affected by the storm makes the request to the World Meteorological Organization (WMO). When the name is retired it may not be used again for at least ten years to avoid public confusion with other storms. Several of the hurricanes that affected Sunset Beach were so destructive that their names were retired. The following is a list of those hurricanes: Hazel, Connie, Ione, Donna, Fran, Floyd, and Charley.

E. Coastal Erosion/Storm Surge

Coastal erosion results from beach-ocean interaction coupled with human activity. This process means that sand is moved from one location to another but it does not leave the system. For example, winter storms may remove significant amounts of sand, creating steep, narrow beaches. In the summer, gentle waves return the sand, widening beaches and creating gentle slopes. Because there are so many variables involved in coastal erosion, including human activity, sea level rise, seasonal fluctuations, and climate change, sand movement will not be consistent year after year in the same location.

At its most basic, erosion represents the movement of sand and earth from one place to another as caused by wind and water. Rain, wind, storms, the tides, and local water currents all affect the rate of erosion. Coastal erosion can impair free access to beaches and threaten the living conditions and livelihood of residents. Natural habitats such as wetlands and lagoon waters are threatened by encroachment of the sea.

Coastal erosion is defined as a change in the position or horizontal displacement of a shoreline over time. This occurrence typically is related to hazardous events such as hurricanes, flooding, storm surge, etc. Humans can also influence erosion through dredging, shoreline hardening, and boat wakes. Coastal erosion is characterized by either a gradual wearing away of land, beach, shorelines, and dunes, or development of steep scarps along the beach face.

Coastal erosion can occur from a short time episode such as storm waves, storm surge, overwash, inland flooding, barrier island breach, rip currents, and undertow. It can also occur from multi-year impacts and long term climatic changes. This list includes sea level rise, sediment loss, subsidence, littoral transport losses, changes in sand-grain size distribution, natural inlets, inland flooding, and rip currents. Long term effects can also occur from human activity such as shore protection measures, aquifer depletion, damming of rivers, sand mining, and destabilization of dunes.

Although coastal erosion is usually not associated with death or injuries, it can cause property damage. If this occurs, it can take months to years to naturally regenerate the coast. Coastal erosion has been included in more than 25 federal disaster declarations in the last 20 years.

The NC Division of Coastal Management evaluates erosion rates about every five (5) years. Shoreline erosion maps released in 2003 (which incorporate the results of a 1998 survey) indicate that about 18% of the shoreline is "severely" eroding, which is defined as areas that are eroding at a rate greater than 4.5 feet per year. According to the study, the majority of Sunset Beach's shoreline has erosion rates of 2.0 feet per year. The likelihood of occurrence for coastal erosion/storm surge is highly likely (see Table 14).

F. Rip Currents

Rip currents can occur along any coastline that features breaking waves. Scientific investigations of wave and current interactions along the coast have shown that rip currents are likely present on most beaches every day as a component of the complex pattern of nearshore circulation. As waves travel from deep to shallow water, they eventually break near the shoreline. As waves break, they generate currents that flow in both the offshore (away from the coast) and the alongshore directions. Currents flowing away from the coast are called rip currents. Rip current strength and speed varies. This variability makes rip currents especially dangerous to uninformed beachgoers.

Rip currents also exist in areas where the strength of the waves are weakened by objects such as rock jetties, piers, natural reefs and even large groups of bathers. Rip currents often look like muddy rivers flowing away from the shore. Rip currents are sometimes mistakenly called "rip tides" or "undertows," but they are not associated with tides and they do not pull people under.

The National Weather Service issues a Surf Zone Forecast that includes the rip current risk for many beaches. Rip current outlooks use the following, three-tiered set of qualifiers:

- **Low Risk** - Wind and/or wave conditions are not expected to support the development of rip currents; however, rip currents can sometimes occur, especially in the vicinity of groins, jetties, and piers. Know how to swim and heed the advice of lifeguards.
- **Moderate Risk** - Wind and/or wave conditions support stronger or more frequent rip currents. Only experienced surf swimmers should enter the water.
- **High Risk** - Wind and/or wave conditions support dangerous rip currents. Rip currents are life-threatening to anyone entering the surf.

The United States Lifesaving Association estimates that the annual number of deaths due to rip currents on the nation's beaches exceeds 100. Rip currents account for over 80% of rescues performed by surf beach lifeguards. The probability of rip currents occurring at Sunset Beach is highly likely (see Table 14).

G. Winter Storms/Freezes

Severe winter storms can produce an array of hazardous weather conditions, including heavy snow, blizzards, freezing rain and ice pellets, and extreme cold. Severe winter storms are extratropical cyclones fueled by strong temperature gradients and an active upper-level jet stream. The winter storms that impact North Carolina generally form in the Gulf of Mexico or off the southeast Atlantic Coast. Few of these storms result in blizzard conditions, defined by the presence of the winds in excess of 35 mph, falling and blowing snow, and a maximum temperature of 20° Fahrenheit. While the frequency and magnitude of snow events are highest in the mountains due to the elevation, the geographical orientation of the mountains and Piedmont contribute to a regular occurrence of freezing precipitation events (e.g., ice pellets and freezing rain) in the Piedmont.

The main effects of winter storms in Brunswick County are immobility and a large number of frozen water pipes. It is important to note that low temperatures are also a hazard for the county and do not necessarily occur during times of sleet and snow. In the winter, the average temperature is 35°F. The lowest mean temperature is 36.5°F. There have been eight (8) incidences of severe winter weather in Brunswick County since 1993. Table 8 provides a summary of those snow and ice events.

Table 8. Brunswick County Severe Winter Storms, 1993-2010

Date	Location	Type	Deaths	Injuries	Damages (Property)
3/12/1993	Statewide	Winter Storm	2	10	\$50.0M
1/15/1994	Statewide	Extreme Cold	3	0	\$500K
1/19/1994	Statewide	Extreme Cold	6	0	0
1/17/2000	Countywide	Snow	0	0	0
1/25/2000	Countywide	Winter Storm	0	0	0
1/2/2002	Countywide	Winter Storm	0	0	0
1/23/2003	Countywide	Winter Storm	0	0	\$150K
2/12/2010	Countywide	Heavy Snow	0	0	0
Totals			11	10	\$50.65M

Source: National Oceanic and Atmospheric Administration.

The entire State of North Carolina has a likelihood of experiencing severe winter weather. The threat varies by location and by type of storm. Coastal areas typically face their greatest threat from nor'easters and other severe winter coastal storms. These storms can contain strong waves and result in extensive beach erosion and flooding. Freezing rain and ice storms typically occur once every several years at coastal locations, and severe snowstorms have been recorded occasionally in coastal areas. The probability of severe winter weather occurring at Sunset Beach is possible (see Table 14).

H. Thunderstorms and Tornadoes

Thunderstorms are the result of convection in the atmosphere. They are typically the by-product of atmospheric instability, which promotes the vigorous rising of air parcels that form cumulus and, eventually, the cumulonimbus (thunderstorm) cloud.

Thunderstorms are underrated in terms of the damage, injury, and death they can bring. A typical thunderstorm may be three miles wide at its base, rise to between 40,000 to 60,000 feet in the troposphere, and contain half a million tons of condensed water. Conglomerations of thunderstorms along cold fronts (with squall lines) can extend for hundreds of miles. Thunderstorms contain tremendous amounts of energy derived from condensation of water. Wind shears sometimes associated with thunderstorms can cause extensive property damage and power outages.

According to the National Weather Service, a severe thunderstorm is a thunderstorm which produces tornadoes, hail 0.75 inch or more in diameter, or winds greater than or equal to 58 mph. However, the tornado is by far the greatest natural hazard threat from a severe thunderstorm.

The National Weather Service defines a tornado as a violently rotating column of air in contact with the ground and extending from the base of a thunderstorm. The intensity, path length, and width of tornadoes are rated according to a scale originally developed by T. Theodore Fujita and Allen D. Pearson in 1971. At the time Fujita derived the scale, little information was available on damage caused by wind, so the original scale presented little more than educated guesses at wind speed ranges for specific tiers of damage. Further research suggested that wind speeds for strong tornadoes on the Fujita scale were greatly overestimated, and on February 1, 2007, the Fujita scale was decommissioned (in the US only) in favor of what scientists believe is a more accurate Enhanced Fujita Scale. The EF Scale is thought to improve on the F-scale on many counts – it accounts for different degrees of damage that occur with different types of structures, both man-made and natural. The expanded and refined damage indicators and degrees of damage standardize what was somewhat ambiguous. It also is thought to provide a much better estimate for wind speeds, and sets no upper limit on the wind speeds for the strongest level, EF5. The Enhanced Fujita Scale is provided in Table 9.

Table 9. Enhanced Fujita Tornado Scale

Category	Wind Speed	Equivalent Saffir-Simpson Scale	Potential Damage
EF0	65-85 mph	N/A	Light Damage: Peels surface off some roofs; some damage to gutters or siding; branches broken off trees; shallow-rooted trees pushed over.
EF1	86-110 mph	Cat 1/2/3	Moderate Damage: Roofs severely stripped; mobile homes overturned or badly damaged; loss of exterior doors; windows and other glass broken.
EF2	111-135 mph	Cat 3/4/5	Considerable Damage: Roofs torn off well-constructed houses; foundations of frame homes shifted; mobile homes completely destroyed; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.
EF3	136-165 mph	Cat 5	Severe Damage: Entire stories of well-constructed houses destroyed; severe damage to large buildings such as shopping malls; trains overturned; trees debarked; heavy cars lifted off the ground and thrown; structures with weak foundations blown away some distance.
EF4	166-200 mph	Cat 5	Devastating Damage: Well-constructed houses and whole frame houses completely leveled; cars thrown and small missiles generated.
EF5	>200 mph	N/A	Explosive Damage: Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 300 feet; steel reinforced concrete structures badly damaged; high-rise buildings have significant structural deformation.

Source: National Oceanic and Atmospheric Administration.

From 1990-2005, there were thirty (30) tornadoes/waterspouts within Brunswick County. While none of tornadoes occurred in Sunset Beach, several passed in close proximity to the Town. According to NOAA, there have been sixty-seven (67) hail storms in Brunswick County from the late 1970s to 2003 that produced hail with diameters of 0.75" or greater. In addition, there have been approximately ninety-three (93) severe thunderstorms/windstorms that have caused injuries, death, or major property damage within the county.

Thunderstorms are common throughout North Carolina, and have occurred in all months. Thunderstorm-related deaths and injuries in North Carolina (1959-1992) have peaked during July and August. Although tornadoes have been reported in North Carolina throughout the year, most of them have occurred in the spring, with 13% in March, 11% in April, 22% in May, and 14% in June. Between 1953 and 1990, 71% of North Carolina's tornadoes were classified as weak, 28% as strong, and about 1% as violent. Based on Southeast Regional Climate Center (SERCC) statistics, North Carolina ranks 22nd in total number of tornadoes and 18th in tornado deaths in the United States for the period 1953-1995.

The probability of thunderstorms and/or tornadoes occurring in Sunset Beach is likely (see Table 14). Since adoption of the Town's 2006 Hazard Mitigation Plan, there have been fifteen (15) thunderstorms/windstorms, twenty-six (26) hail events, and two (2) tornadoes/funnel clouds within Brunswick County.

I. Lightning

Inside of clouds are small particles known as "hydrometeors". As these particles grow and interact, the collisions cause them to become charged. After studying these particles, researchers believe that the smaller particles tend to become positively charged while the larger particles become negatively charged. Gravity pulls the larger, negatively charged particles downward, and updrafts tend to send the smaller, positively charged particles upward. The result is that the higher portion of the cloud has a net positive charge while the lower portion of the cloud has a net negative charge. The separation of particles causes a large electrical potential not only within the cloud itself, but also between the cloud and the earth. This electrical potential can become millions of volts in magnitude. Eventually, the electrical resistance in the air breaks down and lightning, the electrical discharge between the regions of the cloud or between the cloud and the ground, is formed.

Lightning is generally associated with other weather events outlined throughout this section. It is being discussed independently as there are specific measures that may be taken to mitigate the adverse impacts of lightning strikes. Historical data related to lightning occurrences within Brunswick County has been provided, but these events may also be associated with other weather events listed throughout this section. Table 10 provides historical lightning occurrences since 1993. The probability of a lightning strike occurring in Sunset Beach is highly likely (see Table 14).

Table 10. Brunswick County Lightning Storms, 1993-2009

Location	Date	Deaths	Injuries	Damages (Property)
Sunset Beach	9/5/1993	0	1	0
County	7/1/1994	0	0	0
Winnabow	8/5/1994	0	0	\$50 K
Bolivia	7/21/1995	0	0	\$50 K
Calabash	7/23/1995	0	0	\$60 K
Leland	7/2/1996	0	0	\$25 K
Holden Beach	9/18/1997	0	0	\$70 K
Shallotte	6/6/2000	0	0	\$100 K
Leland	5/31/2003	0	0	\$100 K
Shallotte	7/17/2004	1	0	0
Long Beach	8/14/2005	0	0	\$5 K
Shallotte	8/14/2005	0	0	\$15 K
Seccession	3/1/2009	0	0	\$10 K
Totals		1	1	\$485 K

Source: National Oceanic and Atmospheric Administration (NOAA).

J. Dam/Levee Failure

According to the Dam Safety Law of 1967, a dam is defined as a structure erected to impound or divert water. This term is roughly synonymous with the term "levee" and these terms can be used interchangeably. Dams provide tremendous benefits, including water for drinking, power generation, and flood protection. At the same time, however, dams also represent a great risk to public safety, the environment, and local and regional economies when they fail. Flooding may result at many points along a watercourse when a dam failure occurs. Dams are dynamic structures that experience both internal and external changes in their conditions over time. Old pipes may deteriorate and continued development along rivers can cause more runoff. That runoff can result in the overtopping of dams. In addition, large storm events, such as hurricanes or severe thunderstorms, can overwhelm a dam's ability to function properly.

According to "Success and Challenges: National Dam Safety Program 2002" completed in 2002 by the Association of State Dam Safety Officials, forty (40) dams failed in North Carolina following Hurricane Floyd in September of 1999 and over 100 dams overtopped, causing property damage and requiring evacuation of downstream areas to avoid loss of life and injury.

Brunswick County is located in the Cape Fear and Lumber River Basins. According to data obtained from the North Carolina Dam Safety Program within the Division of Land Resources of the NC Department of Environmental and Natural Resources, as of August 10, 2009, there were 1,243 dams in the Cape Fear Basin and 142 dams in the Lumber River Basin. Nine (9) of those dams are located in Brunswick County. Table 11 provides information regarding the dams.

Table 11. Dams In or Affecting Brunswick County

River Basin	State ID Code	Dam Name	River or Stream	Dam Status	Hazard Potential
Cape Fear	BRUNS-001	North Lake Dam	Allen Creek	Impounding	Low
Cape Fear	BRUNS-002	Pine Lake Dam	Allen Creek	Impounding	Low
Cape Fear	BRUNS-003	Boiling Spring Lakes Dam	Allen Creek	Impounding	High
Lumber	BRUNS-004	Hewitt Lake Dam	Shalotte Creek-Os	Impounding	Low
Cape Fear	BRUNS-005	Orton Lake Dam	Orton Creek	Impounding	Low
Cape Fear	BRUNS-006	MOTSU Disposal Dike	Cape Fear River-Os	Exempt-DOD	Low
Lumber	BRUNS-007	Shalotte Wastewater Lagoon No. 1	Shalotte River	Impounding	High
Lumber	BRUNS-009	Shalotte Wastewater Lagoon No. 2	Shalotte River	Impounding	High
Lumber	BRUNS-010	ADM-904 Aeration Basin Dike	N/A	Impounding	Intermediate

Source: North Carolina Dam Inventory August 10, 2009, North Carolina Dam Safety Program.

One (1) of the dams is considered exempt. Exempt status means that a dam is not regulated by dam safety laws because of the size of the dam and/or a low hazard classification. Five (5) of the dams have a low hazard classification, one (1) is classified as intermediate hazard, and three (3) are classified as high hazard dams. The following provides a brief description of each classification:

Hazard Classification	Description	Quantitative Guidelines
Low	Interruption of road service, low volume roads Economic damage	Less than 25 vehicles per day Less than \$30,000
Intermediate	Damage to highways, Interruption of service Economic damage	25 to less than 250 vehicles per day \$30,000 to less than \$200,000
High	Loss of human life due to breached roadway or bridge on or below the dam Economic damage	Probable loss of 1 or more human lives More than \$200,000 250 or more vehicles per day

There have been no historical occurrences of dam/levee failure impacting Brunswick County. Due to this fact, there is no data available to define the extent of flooding. In the event of a dam breach or levee failure, the extent of flooding would be similar to that of a flooding event which on average has been reported to be three (3) feet. The probability of a dam/levee failure affecting the Town of Sunset Beach is possible (see Table 14).

K. Droughts

The National Drought Mitigation Center (NDMC) generally defines a drought as a hazard of nature that is a result of a deficient supply of precipitation to meet the demand. Droughts occur in all types of climate zones and have varying effects on the area experiencing the drought. Droughts

tend to be associated with heat waves. An extended drought period may have economic impacts (agriculture, industry, tourism, etc.), social impacts (nutrition, recreation, public safety, etc.), and environmental impacts (animal/plant, wetland, and water quality).

NDMC also reports that droughts are related to the balance between precipitation and evapotranspiration or to the timing of seasonal occurrences such as rainy seasons. Often, development and human involvement aggravate the impact of droughts. Planning for droughts has become increasingly more important. Thirty-eight states have some type of drought plan in place. North Carolina is one of those states with a drought plan focusing on response.

The Drought Monitoring Council was an interagency coordination and information exchange body created in 1992. In 2002, the council did a creditable job of monitoring and coordinating drought responses while increasing public awareness of the council's function and effectiveness. In 2003, the General Assembly recognized the Drought Monitoring Council's leadership and performance by giving them official statutory status and assigning them the responsibility for issuing drought advisories. The council's name was changed to the Drought Management Advisory Council (DMAC) to reflect the broader role of the council, which extends beyond monitoring drought conditions. The drought advisories provide accurate and consistent information to assist local governments and other water users in taking appropriate drought response actions in specific areas of the state that are exhibiting impending or existing drought conditions.

According to the North Carolina Drought Management Advisory Council, there are four categories of drought. From least detrimental to worst, the drought categories are moderate, severe, extreme, and exceptional. State and federal officials use the different drought categories as a barometer to assist local governments and other water users in taking appropriate drought response actions. For instance, drought officials recommend to water users and local governments experiencing moderate drought to minimize non-essential water uses. Non-essential uses include those that do not have health or safety impacts such as car washing and cleaning streets or sidewalks. However, officials recommend that water users eliminate non-essential water use when areas are experiencing severe drought, a category that is one step worse than moderate drought. Since adoption of the Town's 2006 Hazard Mitigation Plan, the entire state of North Carolina has been under varying degrees of drought condition. As late as September 2009, Brunswick County was being impacted by moderate drought conditions according to the NC Drought Management Advisory Council. However, as of March 2011, the County is no longer experiencing drought conditions. Based on this information, the Town of Sunset Beach would registered near zero on the Keetch-Bryan drought intensity scale outlined below. The likelihood of occurrence for drought is likely (see Table 14).

A more widely recognized method of monitoring drought is the Keetch-Bryan scale as outlined below. The NC Drought Monitoring designations were formulated based on this scale.

- Between 0 and 200, soil moisture and large class fuel moistures are high and do not contribute significantly to fire intensity.

- Readings of 201-400 are typical of late spring, early growing season. Lower litter and duff layers are drying and beginning to contribute to fire intensity.
- Readings of 401-600 are typical of late summer, early fall. Lower litter and duff layers burn intensely.
- Reading of 601-800 are associated with severe drought and increased wildfire occurrence. Intense, deep burning fires with significant downwind spotting. Extensive mop-up required. Live fuels burn actively.

L. Earthquakes

Earthquakes are geologic events that involve movement or shaking of the Earth's crust. Earthquakes are usually caused by the release of stresses accumulated as a result of the rupture of rocks along opposing fault planes in the Earth's outer crust. These fault planes generally follow the outlines of the continents.

Earthquakes are measured in terms of their magnitude and intensity. Magnitude is measured using the Richter Scale, an open-ended logarithmic scale that describes the energy release of an earthquake through a measure of shock wave amplitude. Each unit increase in magnitude on the Richter Scale corresponds to a ten-fold increase in wave amplitude, or a 244-fold increase in energy. Intensity is most commonly measured using the Modified Mercalli Intensity (MMI) Scale. It is a twelve-level scale based on direct and indirect measurements of seismic effects. The scale levels are typically described using roman numerals. Table 12 provides a summary of the Modified Mercalli Scale of Earthquake Intensity and its relation to the Richter Scale.

Table 12. Modified Mercalli Scale of Earthquake Intensity

Scale	Intensity	Description of Effects	Maximum Acceleration (mm/sec)	Corresponding Richter Scale
I	Instrumental	Detected only on seismographs	<10	
II	Feeble	Some people feel it	<25	<4.2
III	Slight	Felt by people resting; like a truck rumbling by	<50	
IV	Moderate	Felt by people walking	<100	
V	Slightly Strong	Sleepers awake, church bells ring	<250	<4.8
VI	Strong	Trees sway; suspended objects swing; objects fall off shelves	<500	<5.4
VII	Very Strong	Mild alarm; walls crack; plaster falls	<1000	<6.1
VIII	Destructive	Moving cars uncontrollable; masonry fractures; poorly constructed buildings damaged	<2500	

Scale	Intensity	Description of Effects	Maximum Acceleration (mm/sec)	Corresponding Richter Scale
IX	Ruinous	Some houses collapse; ground cracks; pipes break open	<5000	<6.9
X	Disastrous	Ground cracks profusely; many buildings destroyed; liquefaction and landslides widespread	<7500	<7.3
XI	Very Disastrous	Most buildings and bridges collapse; roads, railways, pipes and cables destroyed; general triggering of other hazards	<9800	<8.1
XII	Catastrophic	Total destruction; trees fall; ground rises and falls in waves	>9800	>8.1

Source: Local Hazard Mitigation Planning Manual, North Carolina Division of Emergency Management.

Earthquakes are relatively infrequent but not uncommon in North Carolina. The earliest North Carolina earthquake on record is that of March 8, 1735, near Bath. It is likely that this earthquake was less than Intensity V (slightly strong; sleepers awake). During the great earthquake of 1811 (Intensity VI), centered in the Mississippi Valley near New Madrid, Missouri, tremors were felt throughout North Carolina. The most property damage in North Carolina ever attributed to an earthquake was caused by the August 31, 1886, Charleston, South Carolina, shock. The quake left approximately 65 people dead in Charleston and caused chimney collapses, fallen plaster, and cracked walls in Abbottsburg, Charlotte, Elizabethtown, Henderson, Hillsborough, Raleigh, Waynesville, and Whiteville. On February 21, 1916, the Asheville area was the center for a large Intensity VI earthquake, which was felt in Alabama, Georgia, Kentucky, South Carolina, Tennessee, and Virginia. Subsequent minor earthquakes have caused damage in North Carolina in 1926, 1928, 1957, 1959, 1971, 1973, and 1976. There is no history of damage in Sunset Beach resulting from earthquakes.

In North Carolina, earthquake epicenters are generally concentrated in the active Eastern Tennessee Seismic Zone. The Eastern Tennessee Seismic Zone is part of a crescent of moderate seismic activity risk extending from Charleston, South Carolina, northwestward into eastern Tennessee and then curving northeastward into central Virginia. While there have not been any earthquakes with a MMI intensity greater than IV since 1928 in this area, it has the potential to produce an earthquake of significant intensity in the future.

North Carolina's susceptibility to earthquakes decreases from west to east in relation to the Eastern Tennessee Seismic Zone. Generally, there are three different zones of seismic risk in North Carolina. The eastern portion of the State faces minimal effects from seismic activity. Locations in the middle and southeastern areas of the State face a moderate hazard from seismic activity, while the area from Mecklenburg County west through the Blue Ridge faces the greatest risk from seismic activity. These different levels of risk correspond to proximity to areas with historical seismic activity and changes in topography. The Town of Sunset Beach is located in the portion of North Carolina that is less susceptible to the effects of earthquakes. The probability of an earthquake occurring at Sunset Beach is possible (see Table 14).

M. Sinkholes

A sinkhole is a depression or hole in the ground caused by a collapse of the ground's surface. Sinkholes are usually associated with Karst topography, which is a maze of underground caves, caverns, and aquifers. Sinkholes vary in size with the impact being largely contained to the area of the sinkhole itself. However, the impact of the sinkhole on groundwater is much larger. If the area where the sinkhole occurs is contaminated or polluted in any way, the sinkhole offers an ideal place for the pollution to enter the groundwater.

According to the USGS, sinkholes typically occur in areas having limestone, carbonate rock, salt beds, or rocks easily dissolved by water. Sinkholes have also been known to occur above abandoned mines, in areas that have experienced a drought, and they are occurring more frequently in areas experiencing rapid growth. Altering the drainage in an area and groundwater pumping often lowers local and regional groundwater levels to the extent that it causes a sinkhole.

The USGS reports that most of the damage that occurs as a result of sinkholes occurs in the states of Florida, Texas, Alabama, Missouri, Kentucky, Tennessee, and Pennsylvania. The geology of these states lends itself to the likelihood of a sinkhole occurrence. In North Carolina, sinkholes are common features of the outer coastal plain in areas where the Castle Hayne or River Bend Formations occur at or near the surface. Most NC sinkholes become flooded and appear as small to medium sized circular lakes. They can be distinguished from non-sinkhole lakes by the absence of any outflow drainage and lack of relationship to surface drainage systems. Sinkholes rarely impact the Town of Sunset Beach, but do occur periodically on a localized basis. Sinkholes that occur within Sunset Beach on average impact an area of 36 square feet and a depth of 48 inches. Based on Table 14, the likelihood of occurrence for sinkholes in Sunset Beach is unlikely.

N. Tsunamis

A tsunami is a series of waves in a large body of water generated by a disturbance that vertically displaces large amounts of water. Tsunamis are typically caused by earthquakes but can also occur as a result of landslides, volcanic eruptions, explosions, and the impact of cosmic bodies such as meteorites.

Tsunamis have very long wavelengths and periods and can have an average speed of 450 miles per hour. They can travel unnoticed in deep ocean waters, sometimes with a wave height of only twelve inches. However, when the waves reach shallower water, the wave speed slows and the wave height increases significantly. Some tsunamis can reach 100 feet in height and can cause devastation to a coastline.

An indication of an approaching tsunami would be rapid change in water levels on the coastline. The successive crests and troughs can occur from five to ninety minutes apart. Typically the first wave is not the biggest one; therefore, it is not safe to return to the area until authorities deem it safe to return. Areas less than fifty feet above sea level and one mile inland would be at greatest risk for the impact of a tsunami.

There are two types of bulletins to inform an area of the possibility of a tsunami. A Tsunami Watch Bulletin is released following an earthquake of a 6.75 or greater and a Tsunami Warning Bulletin is released when information from a tidal station indicates that the characteristics of the sea match those of a destructive tsunami. Unfortunately 75% of all warnings since 1948 have been false alarms. At the time the current Sunset Beach Hazard Mitigation Plan was being drafted, a Tsunami Warning System was not available on the East Coast of the United States. However, due to the devastation of the Tsunami in Southeast Asia in December, 2004, NOAA has taken steps to expand the US Tsunami Detection and Warning System. In April, 2006, NOAA finished installation of five (5) Deep-Ocean Assessment and Reporting of Tsunami (DART) buoy stations off the East and Gulf Coasts of the US and in the Caribbean Sea that can relay wave information (see Figure 3). In the remote chance that a tsunami were to be detected heading toward the East Coast, alerts would be sent out over the National Weather Service radio network that is used to warn of tornadoes, hurricanes, and other weather hazards.

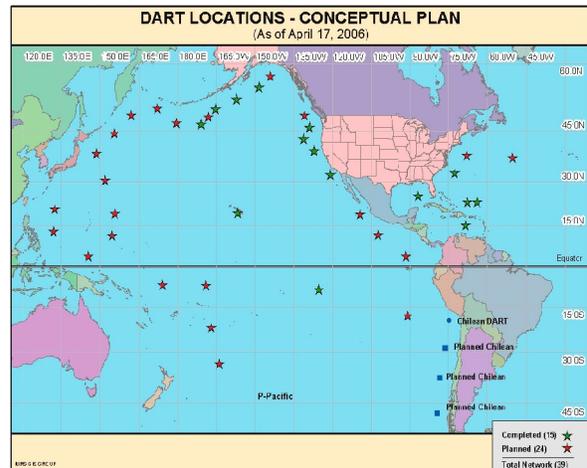


Figure 3. DART Locations (April, 2006)

Source: National Oceanic and Atmospheric Administration.

The only tsunami ever reported on the east coast was in 1929. The tsunami resulted from an earthquake in the Grand Banks of Newfoundland. The quake was felt as far away as Charleston, South Carolina. This tsunami caused considerable property damage and loss of life.

Tsunamis can devastate coastlines, destroy property, and cause an extensive loss of life. It is very hard to detect a tsunami because of its small wave height as it travels through deep water. They are also difficult to predict because of the difficulty in predicting earthquakes.

In the United States, the areas that are most likely to experience a tsunami are on the West Coast. Alaska, Hawaii, Washington, Oregon, and California have received the majority of the tsunamis. Tsunamis are rare on the East Coast. However, there is a fault line in the Atlantic Ocean off the coast of the United States, and cracks have recently been discovered on the continental shelf off the coast of North Carolina and Virginia. According to NCEM, these cracks suggest instability in the continental shelf. If the sea floor falls, it could result in a tsunami along the coast. However, the probability of a tsunami occurring in the Town of Sunset Beach is unlikely (see Table 14).

O. Ranking of Natural Hazard Potential

The hazards outlined within the preceding sections, as well as hazards that have occurred in years prior to 2006 (when the last Hazard Mitigation Plan was prepared), have been ranked below based on a score derived from several factors. Each hazard was ranked based on frequency, number of injuries caused, number of resulting deaths, and dollar amount of property damage losses since 1951. These factors have been ranked on a scale of 1 (High) to 14 (Low). Data utilized to calculate this score was regional in scope including Brunswick County. The table is organized to display the ranking of each hazard with respect to a given factor. As evidenced by the table, the hazards have been listed in order by total hazard potential. Refer to Appendix E for a listing of natural hazard events by year.

Table 13. Town of Sunset Beach/Brunswick County Ranking of Hazard Potential

Hazard	Ranking by Frequency	Ranking by Injuries	Ranking by Deaths	Ranking by Property Damage Loss	Total All Factors
Winter Storm/Freezes	5	1	1	2	9
Thunderstorms/ Windstorms	2	3	4*	3	12
Lightning	4*	4	3*	7	
Hurricanes/Coastal Storms	4*	2	4*	1	11
Flooding	3*	5*	4*	4	16
Tornadoes	3*	5*	4*	5	17
Wildfires**	1	5*	4*	8*	18
Coastal Erosion/ Storm Surge	6	5*	3*	6	20
Rip Currents	7	5*	2	8*	22
Earthquakes***	8	6	5	9	28
Dam/Levee Failure***	8	6	5	9	28
Drought/Heat Waves***	8	6	5	9	28
Tsunamis***	8	6	5	9	28
Sinkholes***	8	6	5	9	28

*Indicates a tie score.

**Frequency data for wildfires is provided courtesy of the NC Division of Forest Resources.

***Due to the lack of historical data, dam/levee failure, earthquakes, sinkholes, drought/heat waves, and tsunamis were given the same score for all factors.

Source: National Oceanic and Atmospheric Administration.

P. Hazard Damage and Likelihood of Occurrence Summary

The following table provides an estimate of damage potential and likelihood of occurrence based on the information in the preceding sections. All factors were taken into account when filling out these tables including: input from town staff members, data documenting historical occurrences, and instances of storms impacting the region since the last Hazard Mitigation Plan Update in 2004.

Table 14. Town of Sunset Beach Hazard Impact

Type of Hazard & Associated Elements	Likelihood of Occurrence ¹ (Highly Likely, Likely, Possible, Unlikely)	Impact Rating ² (Intensity Scales or Relative Terms)	Potential Impact ³ (Catastrophic, Critical, Limited, Negligible)
Wildfires	Possible	Severe	Negligible
Flooding	Likely	Severe	Critical
Hurricanes/Coastal Storms	Highly Likely	Severe	Critical
Coastal Erosion/Storm Surge	Highly Likely	Moderate	Negligible
Rip Currents	Highly Likely	Moderate	Limited
Winter Storm/Freezes	Possible	Severe	Negligible
Thunderstorms and Tornadoes	Likely	Severe	Critical
Lightning	Highly Likely	Severe	Limited
Dam/Levee Failure	Possible	Moderate	Negligible
Earthquakes	Possible	Moderate	Negligible
Sinkholes	Unlikely	Moderate	Limited
Drought/Heat Waves	Likely	Moderate	Limited
Tsunamis	Unlikely	Moderate	Critical

NOTES:

¹ Likelihood of occurrence was estimated based on a **2010 MAC ranking** using historic data and the following chart:

Likelihood	Frequency of Occurrence
Highly Likely	Near 100% probability in the next year.
Likely	Between 10 and 100% probability in the next year, or at least one chance in the next 10 years.
Possible	Between 1 and 10% probability in the next year, or at least one chance in the next 100 years.
Unlikely	Less than 1% probability in the next year, or less than one chance in the next 100 years.

² The hazard's intensity was estimated using historic data and various standardized scales as outlined in Table 13, Ranking of Hazard Potential. This table provides a composite score of hazard impact and potential based on four factors including: frequency, # of injuries, # of deaths, ranking based on total property damage losses. The classification listed in the table above is based on the following classifications:

Severe: Hazard potential ranking of 0 to 19
Moderate: Hazard potential ranking of 20 or greater

³ The potential impact was estimated based on a **2010 MAC ranking** by considering the magnitude of the event, how large an area within the community is affected, and the amount of human activity in that area, then using the following chart as a tool:

Level	Area Affected	Impact
Catastrophic	More than 50%	<ul style="list-style-type: none"> • Multiple deaths • Complete shutdown of facilities for 30 days or more • More than 50 percent of property is severely damaged
Critical	25 to 50%	<ul style="list-style-type: none"> • Multiple severe injuries • Shutdown of critical facilities for 1-2 weeks • More than 25 percent of property is severely damaged
Limited	10 to 25%	<ul style="list-style-type: none"> • Some injuries • Shutdown of some critical facilities 24 hours to one week • More than 10 percent of property is severely damaged
Negligible	Less than 10%	<ul style="list-style-type: none"> • Minor injuries • Minimal quality-of-life impact • Shutdown of some critical facilities and services for 24 hours or less • Less than 10 percent of property is severely damaged
N/A	Hazard has no discernible impact on the built environment	

NOTE: See Appendix F for a complete ranking of hazards by the MAC.

SECTION 4. CAPABILITY ASSESSMENT

A. Institutional Capability

The Town of Sunset Beach was incorporated in 1963 and is governed by a Mayor-Council form of government. There are six departments which include: Administration, Building Inspections and Zoning, Finance, Police, Fire, and Public Works. The Town employs a total of 47 employees.

The Police, Fire, Public Works, and Inspections Departments play a critical role in the mitigation of and response to natural hazards. The adequacy of hospitals and available health care facilities also have an impact on an area's ability to cope with natural hazards. The following provides a brief description of these facilities and departments.

The Town is served by a 25-member fire department manned by 11 paid and 14 volunteer firefighters. In addition, the department coordinates emergency preparedness operations for the Town and works closely with the Town Police Department to address issues relating to emergency response. The Department responds to approximately 900 emergency calls per year and maintains the following equipment:

- Three (3) Class A pumpers
- One (1) 100 foot ladder platform truck
- One (1) brush utility truck
- Two (2) tankers
- One (1) QRV pickup
- One (1) Suburban (water rescue)

The Town of Sunset Beach Police Department provides law enforcement services with a staff of 12 full-time paid officers and seven patrol vehicles. The department provides protective and patrol services. Based on National Standards, a community would normally provide two staff police personnel per 1,000 persons in population. The Town has a 2000 population of 1,824 and in the summer months that number can reach almost 12,000 with overnight visitors. Although this number is low for peak seasonal conditions, the Town maintains an adequate number of police officers to meet demand throughout the year.

The Sunset Beach Public Works Department provides comprehensive services relating to the provision of essential services. The department is responsible for all street maintenance, construction and maintenance of beach accesses, the posting of all signs (i.e., street signs, stop signs, dead end signs), and complaints on non-conforming properties. The Public Works Department plays a critical role in hazard mitigation and post-disaster recovery of the Town.

The Building Inspections and Zoning Department deals with all planning and development related services for the Town. This department is responsible for the enforcement of local building and zoning codes, the international building code, minimum housing standards, the Coastal Area

Management Act's local permitting program; and enforcement of the Town's Flood Damage Prevention Ordinance. Additionally, this department is charged with Community Rating System (CRS) coordination. Through the enforcement and development of land use regulations this department plays an important, proactive role in prevention and mitigation of future problems.

There are two hospitals within close proximity to Sunset Beach, as well as several medical facilities located within the Town's corporate limits.

J. Arthur Doshier Memorial Hospital in Southport, founded in 1930, provides comprehensive medical care to residents of Southport and the surrounding area. The hospital is owned by the Smithville Township taxpayers and is managed by an elected seven-member Board of Trustees. Doshier Memorial Hospital and the Skilled Nursing Center are both accredited by the Joint Commission on Accreditation of Healthcare Organizations. The laboratory and Cardiopulmonary Service are accredited by the College of American Pathologists. The Diagnostic Imaging Department is accredited by the American College of Radiology in Mammography and the hospital has been certified in Mammography by the Food and Drug Administration. The hospital is licensed for 25 acute care beds and 64 licensed skilled nursing center beds and has a staff of 300.

Established in 1977, Brunswick Community Hospital is an acute care hospital located on Highway 17 in the heart of Brunswick County. With a staff of nearly 100 physicians and specialists, 400 employees and 75 volunteers, Brunswick Community Hospital offers a full range of healthcare services and is accredited by the Joint Commission on Accreditation of Healthcare Organizations. In April 2007, Brunswick Community Hospital, affiliated with Novant Health, received approval from the NC Division of Facility Services to build a 74-bed replacement hospital with all private rooms. Construction on the new facility is underway, and hospital officials have unveiled a new name for the facility, Brunswick Novant Medical Center. The location for the new facility is approximately three miles north of the hospital's current location, and is anticipated to open in 2011. The proposed scope of services at the new hospital is as follows:

- 74 acute beds, including Med/Surg, ICU, and Maternity
- 4 observation beds
- All private rooms
- 5 operating rooms, including one C-section room
- 1 GI endoscopy room
- Pharmacy
- Lab
- Emergency room
- Diagnostic imaging, including MRI, CT, mammography, ultrasound, X-ray, and nuclear medicine.
- Rehabilitation services, including physical therapy, cardiac rehabilitation, pulmonary rehabilitation, and speech therapy

B. Plan and Ordinance Review

The following provides a summary of plans and ordinances relevant to hazard mitigation that the Town has completed or with which it is currently involved. The Town has a competent staff that oversees these plans and ordinances.

1. Floodplain Damage Prevention Ordinance

The Town of Sunset Beach participates in the National Flood Insurance Program (NFIP) and complies with all related regulatory requirements. The ordinance is enforced through the Town's building permit issuance process. The ordinance has the following purpose and intent:

"It is the purpose of the ordinance to promote public health, safety, and general welfare and to minimize public and private losses due to flood conditions within floodprone areas by provisions designed to:

- (1) restrict or prohibit uses that are dangerous to health, safety, and property due to water or erosion hazards or that result in damaging increases in erosion, flood heights, or velocities;
- (2) require that uses vulnerable to floods, including facilities that serve such uses, be protected against flood damage at the time of initial construction;
- (3) control the alteration of natural floodplains, stream channels, and natural protective barriers, which are involved in the accommodation of flood waters;
- (4) control filling, grading, dredging, and all other development that may increase erosion or flood damage; and
- (5) prevent or regulate the construction of flood barriers that will unnaturally divert floodwaters or which may increase flood hazards to other lands."

2. North Carolina State Building Code

The Town of Sunset Beach has adopted and enforces the North Carolina State Building Code All Volumes through its Building Inspections and Zoning Department. The NC State Building Codes provide regulation for fire resistance, in addition to seismic, flooding, and high wind resilience. These codes are reviewed annually and amended as new requirements and materials are introduced. Building codes apply primarily to new construction or buildings undergoing substantial alteration. North Carolina has a specific building standard for coastal counties that is designed to ensure a structure's survival in up to 110 mph winds.

Enforcement at the local level extends beyond construction inspections to the advance review of plans. An applicant for a building permit must submit plans to the Town's Building Inspections and Zoning Department for approval. Inspections reviews the plans and elects to approve or reject them or to require revisions. Construction cannot begin until local officials confirm that the plans fully comply with the building code.

A building inspector must then visually monitor the construction of the building. The inspector's duty is to make sure that the project follows the plans as approved. Inspectors are empowered to stop work on projects that fail to conform to the plans. Any observed errors must be fixed before work can continue. The inspector must perform a final review before a certificate of occupancy is issued.

3. Zoning Ordinance

The Town zoning ordinance is included in Chapter 151 of the Municipal Code. The purposes of the zoning ordinance, as stated in the Section 151.001 of the ordinance, are as follows:

"The zoning code is designed to lessen congestion in the streets, to secure safety from fire, panic and other dangers, to provide adequate light and air, to prevent the overcrowding of land, to avoid undue concentration of population and other public requirements. They have been designed to regulate and restrict height, number of stories and size of buildings and other structures; to regulate the size, depth, and width of yards, courts, and other open spaces; to regulate the percentage of lots that may be occupied and regulate the density of population; to regulate and restrict the location and use of buildings, structures, land and water for trade, industry, residence, and other purposes; and for purposes as to divide the town and its extraterritorial area into districts of a number, shape, and area as may be best suited to carry out these regulations and within the districts to regulate and restrict the erection, construction, alterations, repairs, for use of buildings, structures, land and water; to provide for the administration of these regulations; to provide a method of amendment, supplement, change, modification and repeal of regulation, restriction and boundaries; and to prescribe penalties for the violation of its provisions and also for its enforcement."

The zoning ordinance includes the following fifteen land use districts, and a CD overlay district. Each parcel of land in the Town is included in at least one of the following districts:

- **MR-1:** Mainland Residential District. Primarily for residential use, with provisions for single-family residences, planned residential development, regulation championship golf courses, as well as customary and secondary uses.
- **MR-2:** Mainland Residential District. Primarily for residential use, with provisions for single-family residences, planned residential development, as well as customary and secondary uses.

- **MR-3:** Mainland Multi-Family Residential Development. Exclusively for residential development, with provisions for single-family and multi-family development and customary and secondary uses.
- **MB-1:** Mainland Business District. Primarily for the conduct of retail trade with provisions for retail service-type establishments and with provisions for residential uses and convenience-type retail trade establishments.
- **MB-2:** Mainland Mixed-Use District. Primarily established as the district in which the presence of residential and non-residential complementary and integrated uses located within the same complex or same building.
- **MB-P:** Mainland Business-Professional District. Exclusively for qualified professional services and associations.
- **BR-1:** Beach Residential District. Exclusively for residential uses, with provisions for single-family and two-family residences, as well as customary and secondary uses.
- **BR-2:** Beach Residential District: Exclusively for residential uses, with provisions for single-family residences, planned residential development, as well as customary and secondary uses.
- **BB-1:** Beach Business District: Primarily for general business use and with provisions for residential uses and convenience-type trade establishments.
- **MH-1:** Manufactured Home/Conventional Home Residential District. Exclusively for residential uses, with provisions for mobile home single-family and conventional home single-family residences, as well as customary and secondary uses.
- **MH-2:** Manufactured Home Residential District. Exclusively for residential uses, with provision for double-wide mobile homes, as well as customary and secondary uses.
- **AF-1:** Agricultural-Forestry District. Primarily for production of agricultural and forestry products with provisions for single-family homes, provided lots are one-acre minimum in size, and that all other requirements of MR-1 apply for the residential lots.
- **RI-1:** Recreational-Institutional District. Exclusively for the use of government buildings, churches, schools, parks, and like uses.

- **CR-1:** Conservation Reserve District. Primarily for the preservation of significant limited or irreplaceable areas which include major wetlands, open spaces, undeveloped shorelines that are unique, fragile, or hazardous for development. Single-family, low-density residential uses may be permitted in upland areas.
- **MUD:** Mixed Use District. Creates the opportunity for the design of a mixture of land uses. Provide a mixed setting in which those activities associated with retail, office, accommodations, entertainment, residential, and open space uses may occur in a designed environment.

Hazardous areas are zoned for development because the entire Town, to some degree, is considered at risk to hazards. However, hazard mitigation measures are taken during development phases. The measures to be taken are based upon the proposed land use and the hazard that could affect the property.

4. Subdivision Ordinance

Chapter 150.100 of the Municipal Code provides the Town's subdivision regulations. The following excerpt from the subdivision ordinance provides the purpose of the subdivision regulations:

"The procedures and standards for the development and subdivision of real estate and for the surveying and platting thereof, adopted and prescribed in this chapter are hereby found by the Town Council to be necessary and appropriate in order:

- (1) To provide for economical and sufficient streets with adequate widths and with proper alignment and grade;
- (2) To provide space for safe and sanitary dwelling accommodations within the zoning jurisdictions of the Town;
- (3) To provide for suitable residential neighborhoods with adequate streets and utilities and appropriate building sites;
- (4) To save unnecessary expenditure of public funds by studying space and recommending from time to time the purchase of such space for public lands and buildings and by initial proper construction of streets and utilities; and
- (5) To provide proper land records for the convenience of the public and for better identification and permanent location of real estate boundaries."

Specifically, the subdivision regulations require that:

- Town services shall not be provided until a final subdivision plat is approved;
- No streets or utilities shall be accepted until a final subdivision plat is approved;
- No construction permits shall be issued until a final subdivision plat is approved.

5. Community Rating System

Administered by FEMA, the Community Rating System (CRS) provides flood insurance discounts for residents in NFIP communities that undertake floodplain mitigation activities above the minimum NFIP standards. The Town of Sunset Beach participates in the CRS and maintains a Class 8 rating. Participation is voluntary and does require additional mitigation requirements beyond those required by the NFIP.

The Town of Sunset Beach had the potential of reaching a much lower CRS rating; however, as of May 1, 2008, the policy with regard to how the CRS rating is calculated was modified. This modification affected seven NC communities (including Sunset Beach) by reducing their existing ratings to a CRS rating of 8.

The NC State Building Code is predominantly based on the International Building Code (IBC) with the exception of several provisions. In order for a community to achieve a CRS rating lower than an eight, the jurisdiction must maintain a Building Code Effectiveness Grading Schedule (BCEGS) grade of at least a six. Achieving a grade of six is predicated on the enforcement of all standards outlined within the International Building Code. The NC State Building Code does not currently allow for the enforcement of wind borne debris provisions outlined within the IBC. Due to this fact, the Town of Sunset Beach’s BCEGS rating, and in turn their CRS rating has been adversely impacted by this statewide policy.

The BCEGS assesses the building codes in effect in a particular community and how the community enforces its building codes, with special emphasis on mitigation of losses from natural hazards. Municipalities with well-enforced, up-to-date codes should demonstrate better loss experience, and insurance rates can reflect that. The BCEGS program assigns each municipality with a BCEGS grade of 1 (exemplary commitment to building-code enforcement) to 10.

The following provides a breakdown of CRS related benefits:

Rate Class	Property Owner Insurance Discount		Credit Points Required
	SFHA*	Non-SFHA**	
1	45%	10%	4,500 +
2	40%	10%	4,000 - 4,499
3	35%	10%	3,500 - 3,999
4	30%	10%	3,000 - 3,499

Rate Class	Property Owner Insurance Discount		Credit Points Required
	SFHA*	Non-SFHA**	
5	25%	10%	2,500 - 2,999
6	20%	10%	2,000 - 2,499
7	15%	5%	1,500 - 1,999
8	10%	5%	1,000 - 1,499
9	5%	5%	500 - 999
10	0%	0%	0 - 499

*Special Flood Hazard Area.

**Preferred risk policies are available only in B, C, and X zones for properties that are shown to have a minimal risk of flood damage. The preferred risk policy does not receive premium rate credits under the CRS because it already has a lower premium than other policies. Although they are in SFHAs, Zones AR and A99 are limited to a 5% discount. Premium reductions are subject to change.

Source: FEMA.

6. Preparedness and Response Plans

a. **Hurricane Response Plan**

The Town of Sunset Beach Hurricane Response Plan is a detailed emergency response plan aimed at preparing for and responding to a hurricane threat. The plan outlines procedures for securing Town infrastructure and resources as well as evacuation procedures and protocol, and is intended to work in conjunction with the Brunswick County Emergency Operations Plan. The plan provides detailed instructions for all Town departments and personnel. This document is reviewed and updated annually for accuracy in an effort to ensure that all mutual aid and letters of agreement are current.

b. **Re-entry Policy**

The Re-entry Policy works in conjunction with the Hurricane Response Plan and is a sequentially phased plan designed to re-establish municipal operations, assess infrastructure damage, and prepare the Town for the safe return of the property owners. This plan is to be initiated subsequent to the adverse impacts of any weather event necessitating evacuation efforts.

7. Brunswick County Emergency Operations Plan

Although the Brunswick County Emergency Operations Plan is not a document that is officially adopted and activated by the Town, this document plays a critical role for the Town in the event of a disaster situation.

The revised Brunswick County Emergency Operations Plan (EOP) was developed by the County Department of Emergency Management to ensure a coordinated and effective response to any significant hazard that might threaten the county. Each year the EOP is updated in order to

incorporate the most recent technological advances and the most timely information available to the emergency management community, as well as new partnerships that have developed during the year.

Through the use of a functional format, reflective of the Federal Response Plan, the plan encourages an Integrated Emergency Management System (IEMS) approach to disasters. IEMS fosters a prompt, efficient, and coordinated response by all of the diverse elements of the emergency response community. IEMS requires a system-wide integration of skills, people, and resources, and recognizes that plans developed for one type of emergency are extremely useful for other emergency situations. From a budgetary perspective, using the IEMS ensures the best possible use of limited funds and resources from many sources.

8. Coastal Area Management Act (CAMA) Land Use Plan

The Town of Sunset Beach CAMA Land Use Plan Update was adopted on June 7, 2010, and includes policy statements which address the following issues:

- Land Use Compatibility
- Public Access
- Infrastructure
- Natural Hazards Mitigation
- Surface Water Quality

The policy statements have an impact on three areas:

- CAMA minor and major permitting as required by NCGS 113A-118 prior to undertaking any development in any area of environmental concern.
- Establishment of local planning policy.
- Review of proposed projects requiring state or federal assistance or approval to determine consistency with local policies.

Within the current CAMA Land Use Plan, there are policies that address the issue of mitigation and emergency response. The CAMA planning guidelines outlined under 15A NCAC 7B do require that communities establish guidance regarding mitigation objectives. It should be noted, however, that the CAMA Land Use Plan Update defers all hazard mitigation policy to this document.

9. Town of Sunset Beach Stormwater Management Ordinance

The central environmental goals of the Town of Sunset Beach are to restore and preserve water quality and the natural ecological functions of the surface and ground waters that are included in its planning area and to reduce the potential for flooding of residential areas. In order to meet these important goals, the Town of Sunset Beach Stormwater Ordinance was adopted for the following purposes:

- (1) To ensure the health, safety, and general welfare of citizens, and protect and enhance the water quality of watercourses and water bodies in a manner pursuant to and consistent with the Federal Clean Water Act (33 USC § 1251 et. seq.) by reducing pollutants in stormwater discharges to the maximum extent practicable and by prohibiting non-stormwater discharges to the storm drain system.
- (2) To establish minimum criteria to control and minimize the quantitative and qualitative impacts of stormwater runoff from development within Brunswick County.
- (3) To encourage sustainable development. Prudent site planning should include special consideration for preserving natural drainage ways, maximizing infiltration, slowing stormwater runoff from individual sites in route to streams and rivers by use of effective runoff management, structural and non-structural best management practices, drainage structures, and stormwater facilities.

C. Legal Capability

As a general rule, local governments have only that legal authority which is granted to them by their home state. This principle, that all power is vested in the State and can only be exercised to the extent it is delegated, is known as "Dillon's Rule," and applies to all North Carolina's political subdivisions. Enabling legislation in North Carolina grants a wide array of powers to its cities, towns, and counties.

Local regulations that are enacted within the bounds of the state's enabling authority do not automatically meet with judicial acceptance. Any restrictions which local governments impose on land use or building practices must follow the procedural requirements of the Fourteenth Amendment, or risk invalidation.

These and other constitutional mandates apply to federal and state governments, and all their political subdivisions. Any mitigation measures that are undertaken by the local government in its regulatory capacity must be worded and enforced carefully within the parameters established by the state and federal constitutions, even when such measures are authorized by the General Statutes of North Carolina, and even when such measures are enacted in order to protect public health and safety by protecting the community from the impacts of natural hazards.

Within the limits of Dillon's Rule and the federal and state constitutions, local governments in North Carolina have a wide latitude within which to institute mitigation programs, policies, and actions. All local government powers fall into one of four basic groups (although some governmental activities may be classified as more than one type of power): regulation, acquisition, taxation, and spending. Hazard mitigation measures can be carried out under each of the four types of powers. Following are a list of these powers and how they may be useful tools for hazard mitigation:

1. Regulations

- a. **General Police Power**

Local governments in North Carolina have been granted broad regulatory powers in their jurisdictions. The North Carolina General Statutes bestow the general police power on local governments, allowing them to enact and enforce ordinances that define, prohibit, regulate, or abate acts, omissions, or conditions detrimental to the health, safety, and welfare of the people, and to define and abate nuisances (including public health nuisances). Since hazard mitigation can be included under the police power (as protection of public health, safety, and welfare), towns, cities, and counties may include requirements for hazard mitigation in local ordinances. Local governments may also use their ordinance-making power to abate "nuisances," which could include, by local definition, any activity or condition making people or property more vulnerable to any hazard.

- b. **Building Codes and Building Inspections**

Many structural mitigation measures involve constructing and retrofitting homes, businesses, and other structures according to standards designed to make the buildings more resilient to the impacts of natural hazards. Many of these standards are imposed through the building code. North Carolina has a state compulsory building code which applies throughout the state (N.C.G.S. 143-138). However, municipalities and counties may adopt codes for the respective areas if approved by the state as providing "adequate minimum standards." However, local regulations cannot be less restrictive than the state code.

Local governments in North Carolina are also empowered to carry out building inspection. N.C.G.S. Ch. 160A, Art. 19, Part 5; and Ch. 153A, Art. 18, Part 4 empower cities and counties to create an inspection department, and enumerates local duties and responsibilities, which include enforcing state and local laws relating to the construction of buildings; installation of plumbing, electrical, heating systems; building maintenance; and other matters.

c. Land Use

Regulatory powers granted by the state to local governments are the most basic manner in which a local government can control the use of land within its jurisdiction. Through various land use regulatory powers, a local government can control the amount, timing, density, quality, and location of new development – all these characteristics of growth can determine the level of vulnerability of the community in the event of a natural hazard. Land use regulatory powers include the power to engage in planning, and to enact and enforce zoning ordinances, floodplain ordinances, and subdivision controls.

Zoning: Zoning is the traditional and ubiquitous tool available to local governments to control the use of land. Broad enabling authority for municipalities in North Carolina to engage in zoning is granted in N.C.G.S. 160A-381. The statutory purpose for the grant of power is to promote health, safety, morals, or the general welfare of the community. Land “uses” controlled by zoning include the type of use (e.g., residential, commercial, industrial) as well as minimum specifications for use such as lot size, building height and setbacks, density of population, and the like. The local government is authorized to divide its territorial jurisdiction into districts, and to regulate and restrict the erection, construction, reconstruction, alteration, repair or use of buildings, structures, or land within those districts. Districts may include general use districts, overlay districts, and special use districts or conditional use districts. Zoning ordinances consist of maps and written text.

Floodway Regulation: The North Carolina General Statutes declare that the channel and a portion of the floodplain of all the state’s streams will be designated as a floodway, either by the local government or by the state. The legislatively declared purpose of designating these areas as a floodway is to help control and minimize the extent of floods by preventing obstructions which inhibit water flow and increase flood height and damage and other losses (both public and private) in flood hazard areas, and to promote the public health, safety, and welfare of citizens of North Carolina in flood hazard areas.

To carry out this purpose, local governments are empowered to grant permits for the use of the floodways, including the placement of any artificial obstruction in the floodway. No permit is required for certain uses, including agricultural, wildlife and related uses; ground level uses such as parking areas, rotary aircraft ports, lawns, gardens, golf courses, tennis courts, parks, and open space; and similar private and public recreational uses. Existing artificial obstructions in the floodway may not be enlarged or replaced without a permit; local governments are empowered to acquire existing obstructions by purchase, exchange, or condemnation if necessary to avoid flood damages.

The procedures that are laid out for issuing permits for floodway use require the local government to consider the dangerous effects a proposed artificial obstruction may create by causing water to be backed up or diverted; or the danger that the obstruction will be swept downstream to the injury of others; and by the injury or damage that may occur

at the site of the obstruction itself. Local governments are to take into account anticipated development in the foreseeable future which may be adversely affected by the obstruction, as well as existing development.

Planning: In order to exercise the regulatory powers conferred by the General Statutes, local governments in North Carolina are required to create or designate a planning agency. The planning agency may perform a number of duties, including: make studies of the area; determine objectives; prepare and adopt plans for achieving those objectives; develop and recommend policies, ordinances, and administrative means to implement plans; and perform other related duties. The importance of the planning powers of local governments is emphasized in N.C.G.S. 160A-383, which requires that zoning regulations be made in accordance with a comprehensive plan. While the ordinance itself may provide evidence that zoning is being conducted "in accordance with a plan," the existence of a separate planning document ensures that the government is developing regulations and ordinances that are consistent with the overall goals of the community.

Subdivision Regulations: Subdivision regulations control the division of land into parcels for the purpose of building development or sale. Flood-related subdivision controls typically require that subdividers install adequate drainage facilities, and design water and sewer systems to minimize flood damage and contamination. They prohibit the subdivision of land subject to flooding unless flood hazards are overcome through filling or other measures and prohibit filling of floodway areas. They require that subdivision plans be approved prior to the sale of land. Subdivision regulations are a more limited tool than zoning and only indirectly affect the land use or minimum specifications for structures.

Broad subdivision control enabling authority for municipalities is granted in N.C.G.S. 160-371. Subdivision is defined as all divisions of a tract or parcel of land into two or more lots and all divisions involving a new street (N.C.G.S. 160A-376). The definition of subdivision does not include the division of land into parcels greater than 10 acres where no street right-of-way dedication is involved.

The communities in North Carolina thus possess great power (in theory) to prevent unsuitable development in hazard-prone areas.

2. Acquisition

The power of acquisition can be a useful tool for pursuing mitigation goals. Local governments may find the most effective method for completely "hazard-proofing" a particular piece of property or area is to acquire the property (either in fee or a lesser interest, such as an easement), thus removing the property from the private market and eliminating or reducing the possibility of inappropriate development occurring. North Carolina legislation empowers cities, towns, and counties to acquire property for public purpose by gift, grant, devise, bequest, exchange, purchase, lease, or eminent domain. However, the legal authority of a community to

acquire private property through eminent domain exclusively for the purpose of reducing flood damage is questionable at best. Such acquisition would succeed only if an objective public benefit could be demonstrated to accrue from the acquisition.

3. Taxation

Taxation is yet another power granted to local governments by North Carolina law which can be used as a hazard mitigation tool. However, the power of taxation extends beyond merely the collection of revenue. Many communities set preferential tax rates for areas which are unsuitable for development (e.g., agricultural land, wetlands) and can be used to discourage development in hazardous areas.

Local units of government also have the authority to levy special assessments on property owners for all or part of the costs of acquiring, constructing, reconstructing, extending, or otherwise building or improving beach erosion control or flood and hurricane protection works within a designated area. This practice can serve to increase the cost of building in such areas, thereby discouraging development.

Because the usual methods of apportionment seem mechanical and arbitrary, and because the tax burden on a particular piece of property is often quite large, the major constraint in using special assessments is political. Special assessments seem to offer little in terms of control over land use in developing areas. They can, however, be used to finance the provision of services a town deems necessary within its boundaries. In addition, they are useful in distributing to the new property owners the costs of the infrastructure required by new development.

4. Spending

The fourth major power that has been delegated from the North Carolina State General Assembly to local governments is the power to make expenditures in the public interest. Hazard mitigation principles should be made a routine part of all spending decisions made by the local government, including annual budgets and Capital Improvement Plans.

A capital program is usually a timetable by which a municipality indicates the timing and level of municipal services it intends to provide over a specified duration. Capital programming, by itself, can be used as a growth management technique. By tentatively committing itself to a timetable for the provision of capital to extend municipal services, a community can control its growth to some extent especially where the surrounding area is such that the provision of on-site sewage disposal and water supply are unusually expensive. In addition to formulating a timetable for the provision of services, a local community can regulate the extension of and access to municipal services.

A capital improvement program (CIP) that is coordinated with extension and access policies can provide a significant degree of control over the location and timing of growth. These tools can also influence the cost of growth. If the CIP is effective in directing growth away from environmentally sensitive or high hazard areas, for example, it can reduce environmental costs.

D. Fiscal Capability

There are many diverse sources of funding available to communities to implement local hazard mitigation plans, including both government and private programs. Often an organization with a particular focus will fund only part of a project. However, with coordination, the community can combine the funding efforts of one program with those of another, thereby serving multiple missions. The grant and loan programs described in Appendix G provide a significant outlay of funding options, but additional resources are available.

While federal and national programs carry out the bulk of disaster relief programs that provide funds for mitigation, local governments are encouraged to open the search field as widely as possible, and include alternative funding sources to supplement the local hazard mitigation budget. For instance, local businesses and organizations will frequently support projects that benefit their customers or employees, or which constitute good public relations, or "PR." Other groups or individuals may be willing to donate "in-kind" services, eliminating the need for cash. Often the in-kind and volunteer services of local community members can be counted toward the local share that is typically needed to match an outside source of funds.

Local governments may also engage in their own fund-raising efforts to pay for mitigation programs that benefit the community at large. In North Carolina, local governments are granted limited powers to raise revenue for public purpose. The General Assembly has conferred upon cities, towns, and counties the power to levy property taxes for various purposes, including: "ambulance services, rescue squads, and other emergency medical services; beach erosion and natural disasters (including shoreline protection, beach erosion control, and flood and hurricane protection); civil defense; drainage projects or programs; fire protection; hospitals; joint undertakings with other town, city, or political subdivisions; planning; sewage; solid waste; water; water resources; watershed improvement projects" (N.C.G.S. §16A-209). These statutorily enumerated purposes make it clear that local governments are empowered to finance certain emergency management activities, including mitigation activities, with property taxes. Listed below are local resources for mitigation activities:

- Capital Improvements Projects
- Donation
- Insurance
- Private Not-For-Profit
- Public/Private Partnerships
- Volunteer Organizations

E. Political Capability

The Town of Sunset Beach has been integrating hazard mitigation into its community planning efforts. Public education and awareness campaigns about the economic efficiency and social utility of mitigative measures in the long run can help foster its general acceptance by citizens and politicians. The prevention of and recovery from disasters also take close governmental coordination. This effort refers to coordination with and cooperation between agencies in a local government, and between local, state, and federal governments. This coordination is essential in creating a workable local mitigation strategy. The Town of Sunset Beach is politically capable of carrying out this plan and its hazard mitigation goals and objectives.

F. Technical Capability

The Town has been working towards feasible solutions to reducing its vulnerability to the hazards to which it is most susceptible for several years. This effort is evidenced by the Town's diligent response to shoreline erosion and stormwater management. The Town has a competent staff that is responsible for overseeing the hazard mitigation planning process. Town staff has a good understanding of what needs to be achieved to assist with mitigation activities.

Table 15. Sunset Beach Community Capability Assessment Summary

Policies and Programs	Policy/Program Status (potential, existing)	Document Reference	Effectiveness for Mitigation (low, medium, high)	Rationale for Effectiveness	Recommendations for Incorporating into Hazard Mitigation Strategy
Floodplain Development Ordinance	Existing	Chapter 150.200 of Town Code	High	The ordinance allows development in a flood hazard area but requires all new residential construction or substantial improvements of existing construction to be at least two feet above base flood elevation. Nonresidential construction is to be elevated to or above the applicable level of base flood elevation which is adjusted for height.	Revise in conjunction with proposed UDO update.
Enforcement of State Building Code	Existing	NC State Building Code	High	Efficient system for enforcement of State building code.	Continue to support the inclusion of the wind-borne debris requirement.
CAMA Land Use Plan	Existing	N/A	Medium-High	With the exception of development within Areas of Environmental Concern, these documents are not regulatory. They are merely policy documents.	Continue to implement.
Community Rating System (CRS)	Existing	N/A	High	The Town has a Class 8 rating on a scale of 1-10 with 1 being the best rating.	Continue to implement.
Zoning Ordinance	Existing	Chapter 151 of Town Code	High	Adopts development density, lot coverage, and building height requirements.	Consider mitigation measures in conjunction with UDO development during FY2010-2011.
Subdivision Ordinance	Existing	Chapter 150.100 of Town Code	High	Provides for stormwater drainage, density, and common area requirements.	Consider mitigation measures in conjunction with UDO development during FY2010-2011.
Stormwater Management Ordinance	Existing	Chapter 150.350 of Town Code	High	Stormwater management and drainage issues are at the forefront of discussions relating to mitigation and disaster preparedness.	Consider mitigation measures in conjunction with UDO development during FY2010-2011.

SECTION 5. VULNERABILITY ANALYSIS

A. Introduction

Vulnerability to a natural hazard is defined as the extent to which people experience harm and property damage from a hazard. Hazards may result in loss of life or injury to people; loss of or damage to homes, businesses, and industries; loss or damage to automobiles, furnishings, records, and documents; damages or interruptions to power and telephone lines; damage or closing of roads or waterways; and general disruption of life. It is important to know where and to what extent the community is susceptible to the impacts of natural hazards. To fully understand the extent of Sunset Beach's vulnerability, it is necessary to know what is currently at risk and what could be at risk if growth and development occur as is currently permitted.

This section of the HMP identifies specific locations and facilities vulnerable to natural hazards with narrative, data and maps. This section will identify the existing and potential threat posed by each hazard outlined within Section 3 of the plan. Many of the hazards listed pose a direct threat to a defined geographic area, while others are considered to impact the Town's entire corporate limits. Where possible, maps have been provided to further clarify the impact area of a respective hazard type.

B. Existing Development Patterns

There are approximately 7,294 acres within the Town's planning jurisdiction. There are 4,501 parcels of land on approximately 6,522 acres that are developed and 1,527 parcels on 772 acres that are undeveloped. This results in 82.3% of the Town's corporate limits being built out. Map 2 (Appendix A) depicts existing land development patterns within Sunset Beach.

The following vulnerability analysis provides an overview of existing and proposed development within Sunset Beach based on the hazards outlined within Section 3.

C. Vulnerability Analysis Results

1. Hazards Impacting the Town Overall

Several of the hazards outlined within Section 3 result in impacts that are not geographically targeted at a specific area or portion of the Town. The following hazards typically impact the Lower Cape Fear region, and, in turn, affect Sunset Beach: winter storm/freezes, thunderstorms and tornadoes, lightning, earthquakes, and sinkholes. Rip currents and wildfires/urban fires are also considered to potentially impact the Town overall. These weather events may have adverse impacts on a very specific or very broad portion of the Town. Thus, assessment of vulnerability takes into account the Town's entire corporate limits. Refer to Map 2 (Appendix A), Existing Land Use for an overview of the area impacted by these hazards.

It was determined by the MAC that the impact of the following hazards are not confined to specific portions of the town. These hazards may have varying degrees of impact; however, these hazards rarely result in evacuation efforts and do not result in loss of service. The following provides a statement of probability/impact as outlined in Table 14 (Town of Sunset Beach Hazard Impact). This statement of impact is based on four primary factors: probability of occurrence, deaths, injuries, and property damage.

- **Winter Storms/Freezes** – Severe
- **Thunderstorms and Tornadoes** – Severe
- **Lightning** – Severe
- **Rip Currents** – Moderate
- **Wildfires/Urban Fires** – Severe
- **Earthquake** – Moderate
- **Sinkholes** – Moderate

In order to assess existing and future vulnerability, an analysis of existing land use and zoning policy was performed. The Town of Sunset Beach adopted its current CAMA Land Use Plan in June, 2010. As part of this effort, a detailed existing land use survey was conducted. This data provides a snapshot of what is currently developed throughout the town on a parcel-by-parcel basis. Collection of this information was accomplished through a combination of geographic information systems (GIS) analysis and field observations.

In order to make an assessment of future vulnerability potential, all property deemed vacant through the existing land use survey was identified. Each parcel was then cross-referenced with its applicable zoning district. This analysis provides an idea of the level of vulnerability that will exist if these areas are built out under current development regulations. For the purposes of this plan, the Town's zoning districts have been summarized into three independent categories: non-residential, residential, and vacant.

a. Existing Vulnerability

As discussed, Table 16 provides the data associated with property deemed to be vulnerable to severe winter storms, thunderstorms, tornadoes, lightning, rip currents, and wildfires/urban fires. Based on the unpredictable nature of these weather events, it was determined that the Town of Sunset Beach's entire corporate limit area is susceptible to the impact of these events. The following table provides an overview of existing land use for the Town of Sunset Beach. Acreage and property counts are provided, as well as the value of structures and land that fall within Town's corporate limits.

Table 16. Sunset Beach Existing Land Use

Land Use	# of Properties	Acres	% of Total	Building Value
Commercial*	99	88.4	1.2%	\$28,622,380
Conservation	54	2,058.2	28.2%	\$2,514,880
Institutional	9	17.0	0.2%	\$6,542,640
Municipal	7	9.9	0.1%	\$201,290
Recreation	334	3,167.4	43.4%	\$21,454,580
Residential	3,998	1,180.5	16.2%	\$595,494,020
Water	30	111.1	1.6%	\$0
Vacant	1,497	660.6	9.1%	\$0
Total	6,028	7,293.2	100.0%	\$654,829,790

*It should be noted that mixed use development is permitted within several Sunset Beach commercial districts, which may increase the number of residential units.

Source: Town of Sunset Beach, HCP, and Brunswick County.

b. Future Vulnerability

Table 17 summarizes all vacant land in Sunset Beach summarized by respective zoning district. This analysis was performed in an effort to determine the hazard potential if development under current regulations is fully realized. In order to estimate the future value of structures within portions of the Town that are currently vacant, an estimate of total potential investment was calculated. In order to perform estimates, all vacant land was extracted from the existing land use survey and cross-referenced with the parcels applicable zoning district. From this point, average lot sizes and property values were derived from existing conditions within the Town's corporate limits and extraterritorial jurisdiction. In the interest of simplifying the analysis, common zoning districts were grouped as follows:

- **Non-Residential** – MB-1, MB-2, MB-P, BB-1, RI-1, MUD
- **Residential** – MR-1, MR-2, MR-3, BR-1, BR-2, MH-1, MH-2, AF-1

It should be noted that any vacant land zoned CR-1 has not been factored into the following land demand forecast.

The average property value figure was derived by utilizing an average per acre value for each use based on existing conditions as outlined within the existing land use survey. Current tax values in relation to total existing development stock by land use yielded the following average figures (these figures only factor in actual defined **structural** tax value):

- **Non-Residential** – \$307,533*
- **Residential Uses (single- and multi-family)** – \$148,948

*The non-residential value outlined above does not take into account the recreational areas within the town, such as golf courses.

Also, refer to Table 16. These figures serve as approximate value per acre based upon existing structural tax values provided through the Brunswick County Tax Departments. They are not intended to reflect current market conditions or specific value in relation to property within the Town of Sunset Beach. Additionally, these figures do not take into account land value.

Table 17. Sunset Beach Vacant Land by Zoning District*

Use	Acres	% of Total Town Acreage	Additional Units	Total Potential Developed Value**
Nonresidential	42.6	0.6%	42	\$12,916,386
Residential	591.1	8.1%	1,773	\$264,084,804
Total	633.7	8.7%	1,815	\$277,001,190

*It should be noted that lands zoned for recreational and open space uses were not factored into this analysis.

**The dollar figure presented within this column was established by estimating the total number of units within each land use category according to existing conditions and then multiplying the estimated number of units times the average per unit value outlined above. The following provides the average developed site acreage as established through the existing land use survey: Residential average developed site acreage - 12,800 square feet (3 units per acre); Non-residential average developed site acreage - 43,560 square feet (1 unit per acre).

Source: HCP, Inc., Town of Sunset Beach and Brunswick County.

c. Estimated Impact On Residential Development

The hazard mitigation planning guidelines also require jurisdictions to estimate the number of residential structures that may be impacted in the future based on current development guidelines and patterns. In order to meet this requirement, additional residential units have been calculated based on the Town's existing housing stock. According to the existing land use survey, as of 2010, Sunset Beach had approximately 3,998 residential units/parcels.

Based on the total acreage for residential use derived through the existing land use survey (1,180 acres), this results in an average of approximately 3 units per acre, or 12,800 square feet. This figure was then multiplied times the total vacant acreage falling within a residential zoning classification (591.1 acres). The results of this analysis estimate that within Sunset Beach, 1,773 additional housing units are anticipated through build-out. This estimate assumes that current development regulations will remain consistent, and that the corporate limits/ETJ of the Town will not be extended. Based on an average household size of 2.01, as reported in the 2000 US Census, this development will result in an estimated population increase of 3,564 persons. It should

be noted that the estimated increased population may be higher during peak seasonal months. These figures assume build-out of the Town's existing corporate limits. No estimate of how long this will take has been factored into the analysis.

An estimate of commercial/non-residential use was not conducted within the context of this plan. It is difficult to formulate a justifiable projection due the many factors that impact growth and expansion of these uses.

2. Flooding

The following sections provides a summary of vulnerability within Sunset Beach associated with flooding resulting from the following hazards: coastal erosion, flooding, hurricanes/coastal storms, storm surge, and dam/levee failure. This section can also be utilized to assess the potential impacts of a tsunami event; however, the data sets used in this analysis were not intended to address this hazard specifically.

The hazards within this section affect only those properties that fall either within a FEMA-defined flood hazard area or within the limits of the storm surge forecast outlined in this section. It should be noted that this involves a majority of the Town. Storm systems that have historically caused flooding throughout Sunset Beach may result in evacuation procedures, and have the potential to result in widespread property damage. A detailed summary of hurricanes, nor'easters, and other tropical storm systems are provided in Section 3 of the plan. The following provides a statement of probability/impact as outlined in Table 14 (Town of Sunset Beach Hazard Impact). This statement of impact is based on four primary factors: number of occurrences, deaths, injuries, and property damage.

- **Flooding** – Severe
- **Hurricanes/Coastal Storms** – Severe
- **Storm Surge** – Moderate
- **Dam/Levee Failure** – Historical data unavailable
- **Tsunamis** - Historical data unavailable

As discussed in Section 3, flooding primarily impacts the Town of Sunset Beach during coastal storm events in the form of hurricanes and nor'easters. When one of these systems impacts the coast of North Carolina, flood waters inundate a majority of the Town's corporate limits and ETJ as a result of tidal surge. There are three data sets that we have utilized in assessing the Town's vulnerability to flooding resulting from tropical storm events: Flood Insurance Rate Maps (FIRMS), SLOSH Model (fast moving hurricane), and SLOSH model (slow moving hurricane). The following sections provide an analysis of vulnerability in relation to these three geographically referenced data sets. A detailed review of these hazards is provided within Section 3 of the plan, please refer to this section for an explanation and basis for the data sets discussed below.

Flood Insurance Rate Maps (FIRMS): Map 3 (Appendix A) graphically depicts the extent of the high risk flooding areas within Sunset Beach as defined by the Brunswick County Flood Insurance Rate Maps (FIRMS) developed by the Federal Emergency Management Agency (FEMA). FEMA defines areas within "flood zones," based on varying levels of risk of flooding in each area (refer to Page 3-4 of Section 3 for a detailed account of flood zone designation definitions outlined in Table 18 below). Properties in zones "A" and "AE" are considered to be high-risk flood zones, as there is a 1% or greater chance of flooding each year. Properties in zone "X-500" have an approximately .02 or 1 in 500 chance of flooding each year.

Table 18 provides information on the number of acres in the FEMA-defined 100-year and 500-year floodplains within Sunset Beach.

Table 18. Sunset Beach Flood Zones

Flood Zone	Acres	% of Total Town Acreage
VE	3,383	46.4%
AE	260	3.6%
X	41	0.6%
Total	3,684	50.6%

Source: FEMA & Town of Sunset Beach.

a. Existing Vulnerability

The following table provides an estimate of existing vulnerability relating to the VE and AE floodplain zones utilizing the same methodology outlined in Section C.1 above. Estimates for development within the floodplain are based on actual existing conditions within these two flood zones. These two zones were singled out for this analysis, due to the fact that these properties must carry flood insurance, and are typically the focus of specific mitigation measures, it is important to address floodplain development in this manner.

Table 19. Sunset Beach Floodprone Structures

Land Use	# of Properties	Acres	% of Total	Building Value
Commercial*	13	5.9	0.2%	\$2,207,930
Conservation	34	2,006.7	55.1%	\$297,370
Institutional	1	1.3	0.1%	\$27,570
Municipal	1	0.1	0.1%	\$23,930
Recreation	3	26.5	0.7%	\$600,000
Residential	1,382	343.4	9.4%	\$218,088,680
Water	12	91.8	2.3%	\$0
Vacant	540	1,167.8	32.1%	\$0
Total	1,986	3,643.5	100.0%	\$221,245,480

Source: HCP, Sunset Beach, FEMA.

b. Future Vulnerability

The following table provides a breakdown of development potential for portions of Sunset Beach falling within the VE and AE flood zones. This analysis has been based on the same methodology outlined in Section C.1 above.

Table 20. Sunset Beach Vacant Zoning in Floodplain

Use	Acres	% of Total Town Acreage	Additional Units	Total Potential Developed Value**
Non-residential	10.5	0.1%	11	\$3,382,863
Residential	130.4	1.8%	391	\$58,238,668
Total	140.9	1.9%	402	\$61,621,531

Source: HCP, Sunset Beach, FEMA.

c. Estimated Impact On Residential Development

As outlined above, there are approximately 130.4 acres of vacant land zoned for residential development within the Town of Sunset Beach's VE and AE flood zones. Based on an average of 3 units per acre, this will result in approximately 391 additional residential units within the 100-year floodplain at build-out. If this development were to transpire, an additional 786 individuals would be located within a FEMA-defined special flood hazard area (SFHA) during peak seasonal months.

Sea, Lake and Overland Surges from Hurricanes (SLOSH) Model: The greatest threat of flooding in the Town of Sunset Beach is from storm surge. The majority of the Town's land area lies below mean sea level and is potentially subject to storm surge related flooding. Storm surge is ocean overwash associated with hurricanes or other tropical or extra-tropical weather events.

Maps 4 and 5 (Appendix A) show the general areas of Sunset Beach which may be affected by hurricane-generated storm surge based on the SLOSH (Sea, Lake, and Overland Surges from Hurricanes) model developed by the National Oceanic and Atmospheric Administration (NOAA), which computes storm surge heights from tropical cyclones, such as hurricanes. The SLOSH model estimates the extent of storm surge inundation for "fast-moving" storms (forward velocity greater than 15 miles per hour - Map 4) and for "slow-moving" storms (forward velocity less than 15 miles per hour - Map 5). Refer to Table 18 for a summary of acres associated with surge-related flooding.

A detailed breakdown of development within the defined storm surge areas have not been incorporated into this update. The FEMA defined flood hazard areas are a more accurate indicator of flood damage. Please refer to the preceding sections for existing and future vulnerability relating the flood hazard.

3. Drought

No analysis was performed to address the drought hazard. All properties and citizens are equally vulnerable to this risk within Sunset Beach. The Town, along with Brunswick County, will continue to monitor the drought situation in conjunction with the State of North Carolina to ensure that water supply resources are protected and maintained. Through this effort, mandatory water restrictions will be enforced as deemed necessary. This issue is at the forefront of discussions relating to public health and safety throughout the region.

D. Fragile Areas

In coastal North Carolina, fragile areas are considered to include coastal wetlands, ocean hazard areas, shorelines, estuarine waters and shorelines, and sound and estuarine islands, public trust waters, natural heritage areas, areas sustaining remnant species, unique geological formations, registered natural landmarks, swamps, prime wildlife habitats, areas of excessive slope, areas of excessive erosion, scenic points, archaeological sites, historical sites, and 404 wetlands. These areas could easily be damaged or destroyed by inappropriate or poorly planned development. The following fragile areas are found within Sunset Beach.

1. Estuarine and Ocean System

The estuarine and ocean system AEC is a broad category that includes the Town's sounds, marshes, and the surrounding shorelines. The system includes the following components:

- Estuarine waters;
- Estuarine shorelines;
- Coastal wetlands; and
- Public trust areas.

a. Estuarine Water

Estuarine waters include all waters of the Atlantic Ocean within the boundary of North Carolina and all waters of the bays, sounds, rivers, and tributaries seaward of the dividing line between coastal fishing waters and inland fishing waters (GS 113A-113(b)(2)). Sunset Beach's estuarine waters include the Intracoastal Waterway (ICW) and Bird Island. Estuaries are extremely productive natural systems.

Estuarine waters in and around Sunset Beach provide an important habitat for a diverse range of shellfish, birds and other forms of marine wildlife. Important habitat features of an estuarine system include its mud and sand flats, eel grass beds, salt marshes, submerged vegetation flats, clam and oyster beds. They provide nursery areas and serve as habitats for a variety of marine and benthic species. Generally speaking, development activities which are water dependent and require water access and cannot

function elsewhere such as simple access structures, structures to prevent erosion, boat docks, marinas, wharves, and mooring piling may be allowed within this AEC.

b. Estuarine Shoreline

The estuarine shoreline is the non-ocean shoreline, extending from the normal high water level or normal water level along the estuarine waters, estuaries, sounds, bays, fresh and brackish waters, and public areas (15 NCAC 7H.0209). For non-Outstanding Resource Waters, the estuarine shoreline is defined as 75-feet landward from mean high water line (MHWL). For ORW waters the distance is 575 feet; however, there are no ORW waters within Sunset Beach. CAMA permits control development within the shoreline areas. Generally, development in this area may not weaken natural barriers to erosion, must have limited hard surfaces, and must take steps to prevent pollution of the estuary by sedimentation and runoff.

c. Coastal Wetlands

The US Army Corp of Engineers (COE) defines wetlands as those areas inundated and saturated by surface or ground water at a frequency and duration to support a prevalence of vegetation typically adapted for life in saturated soil conditions.

CAMA defines coastal wetlands as any salt marsh or other marsh subject to regular or occasional flooding by tides and contains some, but not necessarily all of the following marsh plant species: Cord Grass, Black Needlerush, Glasswort, Salt Grass, Sea Lavender, Bulrush, Saw Grass, Cat-tail, Salt Meadow Grass, Salt Reed Grass. This definition does not include flooding by tides associated with hurricanes, tropical storms, or severe weather events (15 NCAC 07H.0206).

d. Public Trust Areas

Public trust areas include coastal waters and the submerged tidal lands below the MHWL. The water and submerged tidal lands are held in trust for the public to use through such activities as fishing, swimming, and boating. These areas will often overlap with estuarine waters, but they also include many inland fishing waters. As general guidance, the following lands and waters are considered to be public trust areas:

- All waters of the Atlantic Ocean and the lands underneath, from the MHWL seaward to the state's official boundary three miles offshore;
- All tidally influenced waters below and associated submerged lands below the MHWL;
- All navigable natural water bodies and the lands underneath from the normal high water line seaward (navigable waters include anything you can float a canoe in). This does not include privately-owned lakes where the public doesn't have access rights;

- All water in artificially created water bodies that have significant public fishing resources and are accessible to the public from other waters; and
- All waters in artificially created water bodies where the public has acquired rights by prescription, custom, usage, dedication, or any other means (CAMA Handbook for development in coastal North Carolina).

Accordingly, the Town of Sunset Beach's public trust waters include all estuarine waters, their tributaries, and the Atlantic Ocean.

2. Ocean Hazard System

Ocean Hazard AECs are areas where potential erosion and the adverse impact of sand, wind, and water make uncontrolled or incompatible development unreasonable and hazardous to life and property. The Ocean Hazard category at Sunset Beach includes four (4) areas:

- Ocean erodible area;
- High hazard flood area;
- Inlet hazard area; and
- Unvegetated beach area.

a. **Ocean Erodible Area**

Ocean erodible areas are located along the beach strand where there is significant risk of excessive beach erosion and significant shoreline fluctuation due to natural processes such as hurricanes and tropical storms (15 NCAC 07H.0304). There are 205 acres of oceanfront property on Sunset Beach. The seaward boundary of this area is the mean low water line (MLWL). The landward boundary is described as follows:

- 120 feet or 60 times the annual erosion rate landward of the first line of stable vegetation or, for Sunset Beach the vegetation line established in the 1980 photos, this is called the recession line; or
- A distance landward of the recession line described in (1) above to the recession line that would be generated by a storm having a 1 percent chance of being equaled or exceeded in any given year (i.e., 100-year storm event).

The ocean erodible area is defined on a lot-by-lot basis due to the significant variation in the first line of stable vegetation and the most restrictive method for determining the setback distance and the recession line is always used (15 NCAC 7H.0304).

b. High Hazard Flood Area

The ocean hazard system AEC also covers lands subject to flooding, high waves, and heavy water currents during a major storm. The high hazard flood area is defined as the area subject to high velocity waters including but not limited to hurricane washover in a storm having a one percent chance of being equaled or exceeded in any given year. This area is identified as coastal flood with velocity hazard or "V zones" on Federal Flood Insurance Rate Maps. "V zones" are determined by an engineering analysis of expected flood levels during a storm, expected wave and current patterns, and the existing topography of the land. The high hazard flood area is land expected to experience washover and high velocity waters during a 100-year storm event. This AEC often overlaps with the ocean erodible and inlet hazard AECs. The interior of Sunset Island, Harbor Island, and the sound are in the "A zone." "A zones" are subject to flooding and washover, but not wave action during a 100-year storm event.

c. Unvegetated Beach Area

The final ocean hazard system AEC is the unvegetated beach area. This is defined as land within the ocean hazard system where no stable natural vegetation is present. This area is subject to rapid and unpredictable landform change from wind and wave action.

E. Critical Facilities

After a hazard event it is important to be aware of those facilities that are essential to the health, safety, and viability of the town. A summary of the town's most critical facilities is provided in the table below. Included in the summary are town-owned buildings that are critical to continuity of government operations. The destruction or damage of any of the following facilities could greatly affect rescue and recovery efforts during a hazard event, or could impede rehabilitation efforts after a hazard occurs. These facilities have also been included on Maps 2, 3, and 6 (Appendix A) to show these facilities' relationship to defined hazard areas.

Table 21. Town of Sunset Beach Critical Facilities

Map ID#	Critical Facility	Key Function
1	Town Hall/Police Department	Police department/building inspections/admin offices/EOC
2	Sunset Beach Fire Department	Fire protection
3	Sunset Beach Public Works	Public Works office/storage
4	BEMC Substation	Power supply
5	Brunswick County WWTP	Wastewater treatment
6	All Water System Pump Stations	Potable water supply
7	Sunset Beach Right-of-Ways	Transportation
8	Boat Ramp	Provides public water access

Map ID#	Critical Facility	Key Function
9	Colony WWTP	Wastewater treatment
10	Island Bridge	Transportation/evacuation
11	Sandpiper Bay WWTP	Wastewater treatment
12	Brunswick County EMS Facility	Emergency services

Source: Town of Sunset Beach.

F. Repetitive Loss and Severe Repetitive Loss Structures

As noted in "Keeping Natural Hazards from Becoming Disasters: A Mitigation Planning Guidebook for Local Governments" produced by NCEM, repetitive loss structures are NFIP-insured property that, since 1978 and regardless of any change(s) of ownership during that period, has experienced:

- Four or more paid flood losses of more than \$1,000 each; or
- Two paid flood losses within a 10-year period that, in the aggregate, equal or exceed the current value of the insured property; or
- Three or more paid losses that, in the aggregate, equal or exceed the current value of the insured property.

The only reliable source of information on repetitive loss structures is flood insurance claims data available through the National Flood Insurance Program (NFIP). There are currently two (2) repetitive loss structures at Sunset Beach. This number includes two (2) residential structures and zero (0) non-residential structures. These structures are equally distributed throughout the Town's corporate limits.

The definition of severe repetitive loss as applied to this program was established in section 1361A of the National Flood Insurance Act, as amended (NFIA), 42 U.S.C. 4102a. An SRL property is defined as a residential property that is covered under an NFIP flood insurance policy and:

- (a) That has at least four NFIP claim payments (including building and contents) over \$5,000 each, and the cumulative amount of such claims payments exceeds \$20,000; or
- (b) For which at least two separate claims 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.

For both (a) and (b) above, at least two of the referenced claims must have occurred within any ten-year period, and must be greater than 10 days apart. There are currently no severe repetitive loss properties within the the Town's corporate limits.

SECTION 6. MITIGATION STRATEGIES

A. Introduction

Goals are statements of desirable future conditions that are to be achieved. They are broad in scope and assist in setting community priorities. Objectives are more tangible and specific than goals. The following goals will provide the basis for the objectives, and corresponding implementation strategies that will be included in this plan, some of which are already being administered and implemented through existing Town departments and initiatives:

1. Saving lives and reducing injuries;
2. Preventing or reducing property damage;
3. Reducing economic losses;
4. Minimizing social dislocation and stress;
5. Maintaining critical facilities in functional order;
6. Protecting infrastructure from damage;
7. Protecting mental health;
8. Limiting legal liability of government and public officials;
9. Providing options for political leaders regarding hazard reduction;
10. Fulfilling Federal and State requirements for receipt of future disaster recovery and hazard mitigation assistance; and
11. Improve inter-jurisdictional cooperation and coordination, especially regarding the reduction of natural hazard impacts.

The overall hazard mitigation planning effort is focused on providing the Town of Sunset Beach with an action plan that will strive toward the achievement of these goals. In order to establish this plan, the MAC was charged with developing objectives and specific implementing actions tied to each of these goal statements. The following provides definitions of how goals, objectives, and implementing action relate to one another:

- **Goals** – A broad based statement of intent that establishes the direction for the Town of Sunset Beach Hazard Mitigation Plan. Goals state desired outcomes for the overall implementation process.
- **Objective** – The stated means of achieving each defined goal, or tasks to be executed in the process of achieving stated goals.
- **Implementing Actions** – A project specific strategy aimed at mitigation and involving a specific entity, interest, and funding mechanism.

As the MAC worked through the development of this action plan, the group focused on six primary mitigation focus areas. These focus areas define the various aspects of mitigation, and provide guidance toward the development of a truly comprehensive solution to mitigation planning.

- **Prevention Mechanisms** include regulatory methods such as planning and zoning, building regulations, open space planning, land development regulations, and stormwater management.
- **Property Protection** actions diminish the risk of structural damage through acquisition of land, relocation of buildings, modifying high-risk structures, and floodproofing high-risk structures.
- **Natural Resource Protection** can soften hazard impacts through mechanisms such as erosion and sediment control or wetlands protection.
- **Emergency Services** measures include warning, response capabilities, Town critical infrastructure protection, and health and safety maintenance.
- **Structural Mitigation** controls natural hazards through projects such as reservoirs, levees, diversions, channel modifications and storm sewers.
- **Public Education** includes providing hazard maps and information, outreach programs, real estate disclosure, technical assistance and education.

B. Mitigation Progress Report

1. Public Participation

The Town of Sunset Beach works very closely with the citizens to provide programs and support that will improve the Town's resiliency to natural disasters. Over the last five years, the Town has taken significant steps to improve upon existing emergency service functions and programs. The public was an integral part in carrying out all of these efforts. All issues relating to emergency management policy and programs have been thoroughly discussed with the public and the Sunset Beach Town Council at publicly advertised Planning Board and Council meetings.

Over the last five years, the public has been informed and contacted through the implementation of mitigation strategies. This has been accomplished through annual informational mailers in the Town's newsletter and postings on the Town's website. Through this Hazard Mitigation Plan update, the Town intends to expand public outreach efforts and involvement as outlined in the updated strategies.

2. Monitoring and Evaluation

The Town of Sunset Beach has utilized the information within this document through day-to-day planning efforts. Through monitoring the status of this plan, the Town has not only improved upon the data resources utilized within the vulnerability analysis, but has maximized benefits available through the Community Rating System. The Town's administration maintains a dialogue with the Town Council regarding mitigation/emergency management issues, and

provides the public with information when deemed necessary. Although this plan has not been updated in the interim, the Town has actively monitored the content of the mitigation plan in order to both implement adopted strategies and aid in making important land development policy decisions.

3. Mitigation Strategy Progress

The following section provides a status update regarding the mitigation strategies included in the 2006 Sunset Beach Hazard Mitigation Plan. Strategies that have been completed will not be reflected within the plan update. If a strategy was deemed to be ongoing, or was not completed, then it will remain within the update and will be considered for implementation within the next five years. If a strategy has been deemed ineffective, it will be removed through this update process and justification is provided.

Strategy #1: Support Emergency Operations.

The Town of Sunset Beach plays an integral role in supporting and implementing the Brunswick County Emergency Operations Plan, when activated. Due to the fact that Sunset Beach is a barrier island community, it is critical that the Town's public safety personnel very closely coordinate with the County Emergency Operations Center before, during, and after a disaster strikes. The Town will continue to support the County's efforts, and provide assistance when requested. This strategy has been deemed complete and is part of day-to-day operations; therefore, it is not reflected in the updated strategies.

Status: Ongoing/Completed

NFIP Initiative: No

Strategy #2: Support storm hazard mitigation policies provided in the Sunset Beach CAMA Land Use Plan.

The Town has prepared and adopted this document since the adoption of the 2006 Hazard Mitigation Plan and is actively implementing it. This strategy is not reflected in the updated strategies.

Status: Ongoing/Completed

NFIP Initiative: Yes

Strategy #3: Monitor the status of backup communications, vehicles, and generators for all critical public facilities.

The Town carries out this strategy as a function of annual and monthly staff level duties. The public works and fire departments ensure that all equipment is operating properly and maintains records of all maintenance activity. This effort will be continue and is reflected in the updated plan.

Status: Completed/Ongoing

NFIP Initiative: No

Strategy #4: The high span bridge is the foremost initiative to improve the Town's response capability in emergency conditions. The bridge construction project is in the current NCDOT TIP.

Construction of the high span bridge is nearing completion. This bridge will assist the Town in providing efficient and effective emergency response services. This strategy is not reflected in the updated strategies.

Status: Completed

NFIP Initiative: No

Strategy #5: As a related transportation improvement the Town should continue to coordinate with the NCDOT Wilmington division office, to seek the installation of turn lanes at major intersections to enhance traffic flow during emergencies.

The Town has not established a dialogue with NCDOT concerning this issue. This strategy was not incorporated into the master plan involving the high span bridge improvements, and therefore, is not reflected in the updated strategies.

Status: Removed

NFIP Initiative: No

Strategy #6: In some cases stormwater facilities within the Town must be upgraded to meet demand.

The Town continues to monitor and respond to stormwater drainage issues on an ongoing basis. The Town will continue this effort through implementation of the local stormwater management program. This issue is reflected within the updated strategies.

Status: Revised

NFIP Initiative: No

Strategy #7: The Town should continue to monitor the floodplain requirement of the Flood Damage Prevention Ordinance and make adjustments that are effective in preventing flood damage.

This strategy was not accomplished over the last five years. The Town will aim to update the Flood Damage Prevention Ordinance in conjunction with the development of a Unified Development Ordinance for the town. This effort is expected to get underway in FY2010/2011.

Status: Incomplete

NFIP Initiative: Yes

Strategy #8: Monitor drainage areas to ensure that they are clear and adequate for drainage.

The Town continues to monitor and respond to stormwater drainage issues on an ongoing basis. The Town will continue this effort through implementation of the local stormwater management program. This issue is reflected within the updated strategies.

Status: Ongoing/Revised

NFIP Initiative: No

Strategy #9: Request funding for homes damaged during a hazard.

This strategy has not been implemented to date. Through discussions with the MAC, it was determined that this statement should be removed from the plan because grant funding has not been historically available for this activity.

Status: Eliminated

NFIP Initiative: Yes

Strategy #10: Hold hurricane preparedness workshops and distribute educational materials in utility bills to provide self help resources to property owners.

The Town of Sunset Beach does not hold preparedness workshops internally; however, these sessions are held by the Brunswick County Emergency Management Department. The Town will continue to attend these session and make citizens aware of the date and times of these workshops. The Town has included several outreach mechanisms within this HMP update.

Status: Revised

NFIP Initiative: No

Strategy #11: Review/revise development ordinances and stormwater policies to control runoff.

This Town is about to undertake this effort. Additionally, it is reflected within the updated strategies.

Status: Revised

NFIP Initiative: Yes

C. Mitigation Strategies

The table below outlines all objectives and implementing actions developed through the Town of Sunset Beach planning process. The table provides a description of each objective and supporting actions aimed at furthering each. The table also provides guidance relating to funding sources, party responsible for implementation, priority, and identification of which goals and mitigation focus areas are being addressed through each implementation action.

The objectives in this table have been ranked based on input received from the MAC through the planning process. Each implementing action has been provided a priority of low, medium, or high based on a cost benefit review conducted through the planning process. The ranking of priority involved a detailed discussion of cost-benefit review regarding each strategy. Each defined strategy was assessed based on effectiveness and cost, both financial and in-kind. Only strategies deemed achievable based on both factors were considered. The following provides a breakdown of the factors utilized to conduct this cost benefit review:

- **High Priority:** Highly cost-effective, administratively feasible, and politically feasible policies that should be implemented in fiscal years 2011/2012 and 2012/2013 and be continued.

- **Medium Priority:** Policies that have at least two of the following characteristics (but not all three) and that should be implemented in fiscal years 2013/2014 to 2014/2015:
 1. Highly cost-effective; or
 2. Administratively feasible, given current levels of staffing and resources; or
 3. Are politically popular and supportable given the current environment.

- **Low Priority:** Policies that have at least one of the following characteristics (but not two or three) and that should be implemented in the next five (5) years (by the end of 2015/2016):
 1. Highly cost-effective; or
 2. Administratively feasible, given current levels of staffing and resources; or
 3. Are politically popular and supportable given the current environment

Policies will be implemented earlier if resources are available. It should also be noted that projects or initiatives given low priority may be ultimately contingent upon grant funding.

Objectives were generated by and approved by the MAC. The MAC considered the applicability of each objective to the local government. These objectives provided a context through which the MAC established and formalized specific actions aimed at reducing the Town's vulnerability to natural hazards. These objectives have been slightly modified in order to better suit the mitigation actions outlined in this plan update.

The following summarizes the mitigation objectives:

- **Objective #1:** Reduce the possibility of damage and losses to existing assets, including people, critical infrastructures, and public facilities.

- **Objective #2:** Ensure uninterrupted government and emergency functions in a disaster. This effort should address the overall preparedness of all Town staff and departments.
- **Objective #3:** Ensure that local officials are well trained regarding natural hazards and appropriate prevention and mitigation activities.
- **Objective #4:** Ensure that local building codes/ordinances are consistent with FEMA guidelines and are properly enforced.
- **Objective #5:** Provide adequate communication systems for emergency management agencies and emergency response units. This effort should focus on interagency communication and coordination in the event of a natural or man-made disaster.
- **Objective #6:** Provide residents with adequate warning of potential floods and other meteorological events.
- **Objective #7:** Manage growth through sustainable principles and practices to limit hazard areas through the expansion and protection of green spaces, parks, and bikeways/greenways. Growth management efforts should address stormwater control, sedimentation control, and the limiting of additional impervious surface areas.
- **Objective #8:** Explore funding options for priority mitigation activities.
- **Objective #9:** Ensure that all residents and business owners are aware of the potential hazards associated with their environment and the ways they can protect themselves. This effort will include the development of citizen information on natural, technological, and man-made disaster response.
- **Objective #10:** Evaluate the potential for improving building and infrastructure resistance to natural disasters impacting the Town through coordination with Brunswick County.
- **Objective #11:** Build political support and commitment to becoming less vulnerable to hazards.
- **Objective #12:** Provide adequate shelters during hazard events.

Table 22. Town of Sunset Beach Mitigation Strategies

Number	Strategy	Goals Addressed (see page 6-1)	Hazards Addressed (see page 3-1)	Priority	Update Status (see pages 6-3 to 6-5)	Responsible Party/Dept. (For a detailed implementation summary, refer to Section 7)
Objective #1: Reduce the possibility of damage and losses to existing assets, including people, critical infrastructures, and public facilities.						
1	All future community/critical facilities developed by the Town of Sunset Beach will be located outside of the defined flood hazard area. This includes all facilities required to provide daily services to Town citizens and visitors.	1, 3, 5, 6, 8, 11	2, 3, 4, 9, 13	Medium	New	Primary Responsible Party: Town of Sunset Beach Town Council Secondary Responsible Party: Town of Sunset Beach Administration
2	Sunset Beach will work to make all community/critical facilities disaster resistant. This effort will include the installation of storm shutters and floodproofing, where deemed necessary.	1, 3, 5, 6, 8	2, 3, 4, 7, 8, 9, 10, 13	Medium	New	Primary Responsible Party: Town of Sunset Beach Town Council Secondary Responsible Party: Town of Sunset Beach Administration
3	The Sunset Beach Public Works Department will monitor the Town's municipal storm drainage facilities to ensure that the system is functioning properly. This effort may require maintenance to ensure that the system is not contributing to flooding issues during substantial rain events.	1, 3, 5, 6, 8	2, 3, 4, 9, 13	High	Revised Strategy #6 Strategy #8	Primary Responsible Party: Town of Sunset Beach Public Works Secondary Responsible Party: Town of Sunset Beach Administration
4	The Sunset Beach Fire Department will inspect all fire hydrants within the Town's corporate limits on a revolving schedule. Through this effort, the Town will aim to inspect each hydrant a minimum of two times per calendar year.	1, 3, 5, 6, 8, 11	1, 7, 8	High	New	Primary Responsible Party: Town of Sunset Beach Fire Department Secondary Responsible Party: Town of Sunset Beach Public Works

Number	Strategy	Goals Addressed (see page 6-1)	Hazards Addressed (see page 3-1)	Priority	Update Status (see pages 6-3 to 6-5)	Responsible Party/Dept. (For a detailed implementation summary, refer to Section 7)
Objective #2: Ensure uninterrupted government and emergency functions in a disaster. This effort should address the overall preparedness of all Town staff and departments.						
5	Sunset Beach will hold an internal coordination meeting annually during the month of May to address issues related to hurricane season. This meeting will focus on Town policies and procedures relating to preparation and response to tropical storm/hurricane/hurricane events. If deemed necessary, the public will be informed of changes to existing procedures resulting from this annual effort.	1, 2, 3, 4, 5, 6, 7, 8, 11	2, 3, 4, 9, 13	High	New	Primary Responsible Party: Town of Sunset Beach Fire Department Secondary Responsible Party: Town of Sunset Beach Administration
6	The Town of Sunset Beach police, fire, and public works departments will attend the annual Brunswick County Hurricane Symposium. The symposium addresses interagency coordination between the Brunswick County Emergency Management Department, all County municipalities, and regional utility companies (telephone, electric, and water/sewer facility operators)	1, 3, 5, 6, 8, 11	2, 3, 4, 9, 13	High	Revised Strategy #10	Primary Responsible Party: Town of Sunset Beach Fire Department Secondary Responsible Party: Town of Sunset Beach Administration
7	Sunset Beach will maintain a pre-disaster debris management contract with a qualified provider. The Town will review and assess this contract every three years.	5, 8, 10	2, 3, 4, 9, 13	High	New	Primary Responsible Party: Town of Sunset Beach Town Council Secondary Responsible Party: Town of Sunset Beach Administration
8	The Town will continue to operate and maintain backup generators at all community/critical facilities including the Sunset Beach Fire Department, the Sunset Beach Municipal Building, and the Town's public works facility.	1, 4, 7, 8	2, 3, 4, 7, 8, 9, 10, 13	High	Revised Strategy #3	Primary Responsible Party: Town of Sunset Beach Public Works Secondary Responsible Party: Town of Sunset Beach Fire Department
9	The Sunset Beach Police and Fire Department will pre-plan for necessary staffing levels in preparation for post-disaster response situations. This effort will ensure that appropriate staff support is available in the event of a tropical storm/hurricane.	1, 2, 3, 4, 5, 6, 7, 8, 11	2, 3, 4, 9, 13	High	New	Primary Responsible Party: Town of Sunset Beach Police Department Secondary Responsible Party: Town of Sunset Beach Administration

Number	Strategy	Goals Addressed (see page 6-1)	Hazards Addressed (see page 3-1)	Priority	Update Status (see pages 6-3 to 6-5)	Responsible Party/Dept. (For a detailed implementation summary, refer to Section 7)
Objective #3: Ensure that local officials are well trained regarding natural hazards and appropriate prevention and mitigation activities.						
10	The Town of Sunset Beach will consider sending the Town's floodplain management staff members to attend the FEMA Certified Floodplain Managers course.	1, 2, 3, 5, 6, 8	2, 3, 4, 9, 13	Low	New	Primary Responsible Party: Town of Sunset Beach Administration Secondary Responsible Party: Town of Sunset Beach Town Council
11	The Sunset Beach Police Department will continue to provide annual in-service training to officers including courses focused on: firearms, hazardous materials, blood-borne pathogens, ethics, dealing with juveniles, and domestic violence. Although all of these disciplines do not address natural hazards, continuing education assists the police department in dealing with a wide range of issues and situations.	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	High	New	Primary Responsible Party: Town of Sunset Beach Police Department Secondary Responsible Party: Town of Sunset Beach Administration
12	The Town of Sunset Beach Fire Department will continue to provide annual training to all firefighters on staff. This training will focus on improving upon response times and dealing with issues resulting from man-made and natural disaster situations.	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	High	New	Primary Responsible Party: Town of Sunset Beach Fire Department Secondary Responsible Party: Town of Sunset Beach Administration
13	The Town of Sunset Beach will provide funding for all staff members/departments to secure certifications and continuing education including building inspections, floodplain management, fire service training, police department training, and emergency management training.	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	Medium	New	Primary Responsible Party: Town of Sunset Beach Administration Secondary Responsible Party: Town of Sunset Beach Town Council
Objective #4: Ensure that local building codes/ordinances are consistent with FEMA guidelines and are properly enforced.						
14	The Town of Sunset Beach will review the Town's Flood Damage Prevention Ordinance annually to ensure that the document is consistent with the latest FEMA and NCEM standards.	1, 3, 5, 6, 8, 11	2, 3, 4, 9, 13	High	Revised Strategy #7	Primary Responsible Party: Town of Sunset Beach Zoning/Inspections Secondary Responsible Party: Town of Sunset Beach Administration

Number	Strategy	Goals Addressed (see page 6-1)	Hazards Addressed (see page 3-1)	Priority	Update Status (see pages 6-3 to 6-5)	Responsible Party/Dept. (For a detailed implementation summary, refer to Section 7)
15	The Town of Sunset Beach will continue to require elevation certificates for all development within the defined A, AE, and VE flood hazard areas.	1, 3, 5, 6, 8, 11	2, 3, 4, 9, 13	High	New	Primary Responsible Party: Town of Sunset Beach Zoning/Inspections Secondary Responsible Party: Town of Sunset Beach Administration
16	The Town of Sunset Beach will conduct on-site fire inspections on all non-residential structures a minimum of once annually.	1, 3, 5, 6, 8, 9, 10, 11	1, 12	High	New	Primary Responsible Party: Town of Sunset Beach Fire Department Secondary Responsible Party: Town of Sunset Beach Administration
17	The Town of Sunset Beach will continue to enforce the NC State Building Code.	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	High	New	Primary Responsible Party: Town of Sunset Beach Zoning/Inspections Secondary Responsible Party: Town of Sunset Beach Administration
18	The Town will consider working with regional partners on the development and adoption of legislation that will enable the Town to enforce the wind-borne debris International Building Code standards throughout the Town's corporate limits (enabling the Town to secure a CRS rating lower than 8).	1, 3, 5, 6, 8, 11	2, 3, 4, 9, 13	Low	New	Primary Responsible Party: Town of Sunset Beach Town Council Secondary Responsible Party: Town of Sunset Beach Administration
19	The Town will establish funding to work through a comprehensive update of all land development ordinances.	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	High	New	Primary Responsible Party: Town of Sunset Beach Administration Secondary Responsible Party: Town of Sunset Beach Town Council

Number	Strategy	Goals Addressed (see page 6-1)	Hazards Addressed (see page 3-1)	Priority	Update Status (see pages 6-3 to 6-5)	Responsible Party/Dept. (For a detailed implementation summary, refer to Section 7)
Objective #5: Provide adequate communication systems for emergency management agencies and emergency response units. This effort should focus on interagency communication and coordination in the event of a natural or man-made disaster.						
20	Sunset Beach will continue to work closely with the Brunswick County Emergency Management Department on improving the County's multi-jurisdictional communications system in an effort to enhance interoperability. The Sunset Beach Fire Chief will attend bi-monthly meetings with the County Emergency Management Department to address this issue.	1, 2, 4, 5, 7, 11	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	Medium	New	Primary Responsible Party: Town of Sunset Beach Fire Department Secondary Responsible Party: Town of Sunset Beach Police Department
21	The Town of Sunset Beach administration and Town Council will advocate the establishment of an 800 MHz communication system for the County, as well as all municipalities. Establishment of this system will make the County compatible with the latest communications technology and will alleviate many of the issues present in dealing with the existing system.	1, 2, 4, 5, 7	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	Medium	New	Primary Responsible Party: Town of Sunset Beach Administration Secondary Responsible Party: Town of Sunset Beach Town Council
22	The Town of Sunset Beach will research the feasibility of establishing an internal communication system that operates independent of the existing County-wide infrastructure.	1, 2, 4, 5, 7, 9	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	Low	New	Primary Responsible Party: Town of Sunset Beach Administration Secondary Responsible Party: Town of Sunset Beach Town Council
23	The Town of Sunset Beach will participate in scheduled conference calls with the County Emergency Operations Center as the imminent threat of severe weather approaches. The call will be scheduled by the County Emergency Management Department and all town departments should be represented.	1, 2, 4, 5, 11	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	Medium	New	Primary Responsible Party: Town of Sunset Beach Fire Department Secondary Responsible Party: Town of Sunset Beach Administration

Number	Strategy	Goals Addressed (see page 6-1)	Hazards Addressed (see page 3-1)	Priority	Update Status (see pages 6-3 to 6-5)	Responsible Party/Dept. (For a detailed implementation summary, refer to Section 7)
Objective #6: Provide residents with adequate warning of potential floods and other meteorological events.						
24	The Town of Sunset Beach will maintain an internal early warning system to assist in notifying town residents of issues related to natural and man-made hazards. The maintenance of this system should involve an outreach effort to ensure that all residents have their telephone numbers registered in the notification system.	1, 2, 4, 7	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	High	New	Primary Responsible Party: Town of Sunset Beach Administration Secondary Responsible Party: Town of Sunset Beach Fire Department
25	The Town will review and update hurricane re-entry and evacuation procedures on an annual basis.	1, 2, 4, 7, 9, 10	2, 3, 4, 9, 13	High	New	Primary Responsible Party: Town of Sunset Beach Administration Secondary Responsible Party: Town of Sunset Beach Town Council
26	The Sunset Beach Town Council will maintain a staff level Public Information officer charged with disseminating information relating to threats associated with man-made and natural disasters. The Public Information Officer's role and duties are defined within the Town's Hurricane Operations Plan.	1, 2, 4, 7	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	High	New	Primary Responsible Party: Town of Sunset Beach Administration Secondary Responsible Party: Town of Sunset Beach Fire Department
27	The Town of Sunset Beach will provide information relating to natural and man-made disaster situations through all available outlets including news media, the Town's website, and the Town's emergency notification system.	1, 2, 3, 4, 5, 7	2, 3, 4, 9, 13	High	New	Primary Responsible Party: Town of Sunset Beach Administration Secondary Responsible Party: Town of Sunset Beach Fire Department
28	Sunset Beach will maintain a policy of patrolling portions of the Town under mandatory evacuation procedures as the threat of severe weather approaches. This effort will ensure that all residents and visitors within those areas are clearly aware of the evacuation order and will respond accordingly.	1, 2, 3, 4, 5, 7	2, 3, 4, 9, 13	High	New	Primary Responsible Party: Town of Sunset Beach Police Department Secondary Responsible Party: Town of Sunset Beach Administration

Number	Strategy	Goals Addressed (see page 6-1)	Hazards Addressed (see page 3-1)	Priority	Update Status (see pages 6-3 to 6-5)	Responsible Party/Dept. (For a detailed implementation summary, refer to Section 7)
29	The Town will work with local media outlets as well as the Brunswick County Emergency Management Department to promote the importance of hand-held NOAA weather radios. These radio systems provide efficient and prompt notice of approaching severe weather.	1, 2, 3, 4, 5, 7, 11	2, 3, 4, 9, 13	High	New	Primary Responsible Party: Town of Sunset Beach Administration Secondary Responsible Party: Town of Sunset Beach Fire Department
Objective #7: Manage growth through sustainable principles and practices to limit hazard areas through the expansion and protection of green spaces, parks, and bikeways/greenways. Growth management efforts should address stormwater control, sedimentation control, and the limiting of additional impervious surface areas.						
30	As stated previously, the Town of Sunset Beach will establish funding to work through a comprehensive update of all land development ordinances. This effort will include a review of local stormwater and sedimentation control regulations.	1, 2, 3, 6	1, 2, 3, 4, 9, 10, 13	High	Revised Strategy #11	Primary Responsible Party: Town of Sunset Beach Administration Secondary Responsible Party: Town of Sunset Beach Town Council
31	The Town of Sunset Beach will continue to require that all development occurring along Main Street must be located within 150 feet of the property line abutting the right-of-way. This strategy is intended to protect the primary frontal dune structure running the extent of the Island.	1, 2, 3, 6	1, 2, 3, 4, 9, 10, 13	High	New	Primary Responsible Party: Town of Sunset Beach Inspections/Zoning Secondary Responsible Party: Town of Sunset Beach Town Council
32	In working through the revisions of the Town's land development ordinances, the Sunset Beach Planning Board and Town Council will consider increasing the amount of open space required for all subdivisions with ten or more subdivided lots.	1, 2, 3, 6	1, 2, 3, 4, 9, 10, 13	High	New	Primary Responsible Party: Town of Sunset Beach Administration Secondary Responsible Party: Town of Sunset Beach Town Council
33	The Town will continue to impose its impervious surface limits whereby a property owner must installed an on-site stormwater retention and/or detention facility if the total impervious surface area exceeds 30% of a given site. These systems must be designed to retain all runoff generated by the impervious coverage in excess of the stated 30%.	1, 2, 3, 6	1, 2, 3, 4, 9, 10, 13	High	New	Primary Responsible Party: Town of Sunset Beach Inspections/Zoning Secondary Responsible Party: Town of Sunset Beach Town Council

Number	Strategy	Goals Addressed (see page 6-1)	Hazards Addressed (see page 3-1)	Priority	Update Status (see pages 6-3 to 6-5)	Responsible Party/Dept. (For a detailed implementation summary, refer to Section 7)
34	The Town of Sunset Beach will continue to work with Brunswick County on the enforcement of their Stormwater Management Ordinance.	1, 2, 3, 6, 8, 11	1, 2, 3, 4, 9, 10, 13	High	New	Primary Responsible Party: Town of Sunset Beach Inspections/Zoning Secondary Responsible Party: Town of Sunset Beach Town Council
35	The Town of Sunset Beach will continue to work with the NC Department of Environment and Natural Resources on the enforcement of the NC Statewide Stormwater Management Program.	1, 2, 3, 6, 8, 11	1, 2, 3, 4, 9, 10, 13	High	New	Primary Responsible Party: Town of Sunset Beach Inspections/Zoning Secondary Responsible Party: Town of Sunset Beach Town Council
36	The Town of Sunset Beach will maintain a policy of supporting single-family residential development as a desired land use pattern. Residential density and the establishment of non-residential land uses will be significant issues discussed while working through the revision of the Town's land development ordinances.	1, 2, 3, 6, 8, 9, 10, 11	1, 2, 3, 4, 9, 10, 13	High	New	Primary Responsible Party: Town of Sunset Beach Town Council Secondary Responsible Party: Town of Sunset Beach Administration
Objective #8: Explore funding options for priority mitigation activities.						
37	The Town of Sunset Beach will assist property owners in applying for post-disaster mitigation funding for acquisition/relocation grant programs following a natural disaster.	2, 3, 4, 7, 11	2, 3, 7, 8, 9, 13	High	Revised Strategy #9	Primary Responsible Party: Town of Sunset Beach Administration Secondary Responsible Party: Town of Sunset Beach Town Council
38	The Town of Sunset Beach will work closely with Brunswick County Emergency Management to maintain clear and accurate records regarding expenses related to post-disaster recovery and clean up. This effort will be focused on ensuring that the Town may recover expenses relating to the disaster situation.	1, 2, 3, 9, 10, 11	2, 3, 7, 8, 9, 13	High	New	Primary Responsible Party: Town of Sunset Beach Administration Secondary Responsible Party: Town of Sunset Beach Town Council

Number	Strategy	Goals Addressed (see page 6-1)	Hazards Addressed (see page 3-1)	Priority	Update Status (see pages 6-3 to 6-5)	Responsible Party/Dept. (For a detailed implementation summary, refer to Section 7)
39	Sunset Beach will seek out grant funding for the installation of storm shutters on the Town's fire department facility.	1, 2, 3, 4, 5, 9, 10, 11	2, 3, 7, 8, 9, 13	Medium	New	Primary Responsible Party: Town of Sunset Beach Administration Secondary Responsible Party: Town of Sunset Beach Town Council
40	Sunset Beach will seek grant funding for the acquisition of internal communication system equipment. This effort will work towards the goal of improving upon the Town's emergency response capabilities.	1, 2, 3, 9, 10, 11	2, 3, 7, 8, 9, 13	High	New	Primary Responsible Party: Town of Sunset Beach Administration Secondary Responsible Party: Town of Sunset Beach Town Council
41	Sunset Beach will seek grant funding to acquire equipment needed to provide comprehensive ocean rescue services.	1, 2, 3, 9, 10, 11	2, 3, 5, 7, 8, 9, 13	Medium	New	Primary Responsible Party: Town of Sunset Beach Administration Secondary Responsible Party: Town of Sunset Beach Town Council
Objective #9: Ensure that all residents and business owners are aware of the potential hazards associated with their environment and the ways they can protect themselves. This effort will include the development of citizen information on natural, technological, and man-made disaster response.						
42	The Town of Sunset Beach will update its website to include more comprehensive information relating to emergency response and mitigation. This information will cover a wide range of topics including: evacuation procedures, mitigation options, floodplain protection, emergency preparedness, and special needs registry efforts.	1, 2, 3, 4, 5, 6, 7, 11	1, 2, 3, 5, 11, 12, 13	High	New	Primary Responsible Party: Town of Sunset Beach Administration Secondary Responsible Party: Town of Sunset Beach Town Council
43	Sunset Beach will continue to provide information to citizens following a natural hazard event that outlines the policies regarding evacuation, re-entry, and recovery. This information will be updated annually as procedures change over time.	1, 2, 3, 4, 5, 6, 7, 11	1, 2, 3, 5, 11, 12, 13	High	New	Primary Responsible Party: Town of Sunset Beach Administration Secondary Responsible Party: Town of Sunset Beach Town Council
44	Sunset Beach will maintain information at the local library relating to floodplain protection and mitigation. This effort will be carried out as part of the Town's Community Rating System (CRS) program.	1, 3, 5, 6, 8, 11	2, 3, 4, 9, 13	Medium	New	Primary Responsible Party: Town of Sunset Beach Inspections/Zoning Secondary Responsible Party: Town of Sunset Beach Administration

Number	Strategy	Goals Addressed (see page 6-1)	Hazards Addressed (see page 3-1)	Priority	Update Status (see pages 6-3 to 6-5)	Responsible Party/Dept. (For a detailed implementation summary, refer to Section 7)
45	The Town will continue to mail out a Town newsletter quarterly. As an element of this newsletter, the Town will include information relating to emergency preparedness.	1, 2, 3, 4, 5, 6, 7, 11	1, 2, 3, 5, 11, 12, 13	High	New	Primary Responsible Party: Town of Sunset Beach Administration Secondary Responsible Party: Town of Sunset Beach Town Council
46	The Town of Sunset Beach will continue to provide day-to-day counseling services to contractors and property owners regarding floodplain protection and mitigation practices. This effort will include site visits when deemed necessary.	1, 3, 5, 6, 8, 11	2, 3, 4, 9, 13	Medium	New	Primary Responsible Party: Town of Sunset Beach Inspections/Zoning Secondary Responsible Party: Town of Sunset Beach Administration
Objective #10: Evaluate the potential for improving building and infrastructure resistance to natural disasters impacting the Town through coordination with Brunswick County.						
47	The Town of Sunset Beach will continue to maintain all publicly-owned streets in a manner that will provide efficient and safe ingress and egress for all citizens. Additionally, the Town will maintain a policy of accepting private streets for maintenance assuming those streets are developed to appropriate standards.	1, 4, 6, 8	2, 3, 4, 9, 13	High	New	Primary Responsible Party: Town of Sunset Beach Town Council Secondary Responsible Party: Town of Sunset Beach Administration
48	The Town of Sunset Beach will incorporate language into the Town's ordinance requiring all new gated communities to provide clear and adequate access for emergency service vehicles.	1, 2, 3, 4, 5, 9, 10, 11	2, 3, 7, 8, 9, 13	Medium	New	Primary Responsible Party: Town of Sunset Beach Administration Secondary Responsible Party: Town of Sunset Beach Town Council
49	The Town of Sunset Beach will factor protection from natural hazards into discussions involving the update of the Town's land development ordinances. This effort is expected to be completed within the next two years.	1, 2, 3, 4, 5, 9, 10, 11	2, 3, 7, 8, 9, 13	Medium	New	Primary Responsible Party: Town of Sunset Beach Administration Secondary Responsible Party: Town of Sunset Beach Town Council
50	The Town will maintain a dialogue with regional electric service providers, as well as water and sewer service providers in an effort to better prepare for the impacts associated with natural hazard events.	1, 3, 5, 6, 8, 11	2, 3, 4, 9, 13	Medium	New	Primary Responsible Party: Town of Sunset Beach Inspections/Zoning Secondary Responsible Party: Town of Sunset Beach Administration

Number	Strategy	Goals Addressed (see page 6-1)	Hazards Addressed (see page 3-1)	Priority	Update Status (see pages 6-3 to 6-5)	Responsible Party/Dept. (For a detailed implementation summary, refer to Section 7)
Objective #11: Build political support and commitment to becoming less vulnerable to hazards.						
52	The Town of Sunset Beach will adopt this HMP and work towards the implementation of all strategies. Additionally, the Town will maintain good standing with both the NFIP and CRS programs.	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	High	New	Primary Responsible Party: Town of Sunset Beach Town Council Secondary Responsible Party: Town of Sunset Beach Administration
53	The Town of Sunset Beach will factor all projects outlined in these strategies into annual budget discussions. Some of the equipment and facility improvements proposed in this plan may require local investment.	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13	High	New	Primary Responsible Party: Town of Sunset Beach Town Council Secondary Responsible Party: Town of Sunset Beach Administration
Objective #12: Provide adequate shelters during hazard events.						
54	The Town of Sunset Beach will work closely with the Brunswick County Emergency Management Department to ensure that citizens and visitors have safe and efficient access to shelter facilities.	1, 2, 3, 6, 9, 11	1, 2, 3, 4, 9, 10, 13	High	New	Primary Responsible Party: Town of Sunset Beach Fire Department Secondary Responsible Party: Town of Sunset Beach Administration
55	The Town will inform citizens of shelter locations and policies through the following: posting on the Town's website, materials provided when receiving re-entry permits, the Town's quarterly newsletter, the Town's designated Public Information Officer.	1, 2, 3, 6, 9, 11	1, 2, 3, 4, 9, 10, 13	High	New	Primary Responsible Party: Town of Sunset Beach Fire Department Secondary Responsible Party: Town of Sunset Beach Administration

SECTION 7. PLAN MAINTENANCE AND IMPLEMENTATION PROCEDURES

A. Introduction

The Plan Maintenance and Implementation Procedures section of the plan has been completely revised to reflect the Town's intentions for implementation, maintenance, and public participation over the next five years. It was determined by the MAC that this section should be revised through each update to better define these issues and appropriately lay out a plan for implementation.

B. Implementation

Implementation of the Town of Sunset Beach Hazard Mitigation Plan will commence with adoption of the document by the Town. The Resolution of Adoption is provided as Appendix D of the plan.

Upon adoption, the Sunset Beach Hazard Mitigation Plan faces the truest test of its worth – implementation. Implementation implies two concepts: action and priority. These are closely related. While this plan puts forth many worthwhile and high priority recommendations, the decision about which action to undertake first will be the first task facing the Mitigation Advisory Committee (MAC). There are two factors to consider in making that decision: the priority of the item and available funding. Thus, pursuing low or no-cost high-priority recommendations will have the greatest likelihood of success.

Another important implementation mechanism that is highly effective and low-cost is incorporation of the hazard mitigation plan recommendations and their underlying principles into other municipal plans and regulatory mechanisms, such as Capital Improvements Plans and Land Use Plans. The Town will utilize this plan as a starting point toward implementing policies and programs to reduce losses to life and property from natural hazards.

Mitigation is most successful when it is incorporated into the day-to-day functions and priorities of government and development. This integration is accomplished by constant efforts to network, identify, and highlight the multi-objective benefits to each program, and its stakeholders. This effort is achieved through the routine actions of monitoring implementation efforts, attending meetings, and promoting a safe, sustainable community. Additional mitigation strategies could include consistent and ongoing enforcement of existing policies and review of municipal programs for coordination and regional multi-objective opportunities.

Simultaneous to these efforts, it is important to maintain a constant monitoring of funding opportunities that can be leveraged to implement some of the more costly recommended actions. This effort will include creating and maintaining a bank of ideas on how any required local match or participation requirement can be met. When funding does become available, the MAC will be in a position to capitalize on the opportunity. Funding opportunities to be monitored include special pre- and post-disaster funds, special district budgeted funds, state or federal earmarked funds, and grant programs, including those that can serve or support multi-objective implementing actions.

C. Role of the Mitigation Advisory Committee in Implementation and Maintenance

With adoption of this plan, the MAC will be tasked with plan implementation and maintenance. The MAC, led by Jeff Curtis, Sunset Beach Building Inspections and Zoning Department, agrees to:

- Act as a forum for hazard mitigation issues;
- Disseminate hazard mitigation ideas and activities to all participants;
- Pursue the implementation of high-priority, low/no-cost recommended actions;
- Keep the concept of mitigation in the forefront of community decision-making by identifying plan recommendations when other community goals, plans, and activities overlap, influence, or directly affect increased community vulnerability to disasters;
- Continuously monitor multi-objective cost-share opportunities to help the community implement the plan's recommended actions for which no current funding exists;
- Monitor and assist in implementation and update of this plan;
- Report on plan progress and recommended changes to the Sunset Beach Town Council; and
- Inform and solicit input from the public.

The MAC will not have any powers over municipal staff; it will be purely an advisory body. Its primary duty is to see the plan successfully carried out and to report to the community governing board and the public on the status of plan implementation and mitigation opportunities for the Town. Other duties include reviewing and promoting mitigation proposals, considering stakeholder concerns about hazard mitigation, passing concerns on to appropriate entities, and posting relevant information on the Town website.

D. Evaluation, Monitoring, and Updating

Plan maintenance implies an ongoing effort to monitor and evaluate plan implementation and to update the plan as progress, roadblocks, or changing circumstances are recognized.

In order to track progress and update the mitigation strategies identified in the policy section of the plan, the Town will revisit this plan on a quarterly basis and after a hazard event. The Chief Building Inspector is responsible for initiating this review and will consult with members of the MAC. This monitoring and updating will take place through a formal review by the MAC twice annually, and a five-year written update to be submitted to NCEM and FEMA Region IV, unless disaster or other circumstances (e.g., changing regulations) require a change to this schedule.

Evaluation of progress can be achieved by monitoring changes in vulnerabilities identified in the plan. Changes in vulnerability can be identified by noting:

- Decreased vulnerability as a result of implementing recommended actions;
- Increased vulnerability as a result of failed or ineffective mitigation actions; and/or

- Increased vulnerability as a result of new development (and/or annexation).

Updates to this plan will:

- Consider changes in vulnerability due to project implementation;
- Document success stories where mitigation efforts have proven effective;
- Document areas where mitigation actions were not effective;
- Document any new hazards that may arise or were previously overlooked;
- Incorporate new data or studies on hazards and risks;
- Incorporate new capabilities or changes in capabilities;
- Incorporate growth and development-related changes to Town inventories; and
- Incorporate new project recommendations or changes in project prioritization.

In order to best evaluate any changes in vulnerability as a result of plan implementation, the MAC will use the following process:

- A representative from the responsible office identified in each mitigation strategy will be responsible for tracking and reporting on a bi-annual basis to the MAC on project status and provide input on whether the project as implemented meets the defined objectives and is likely to be successful in reducing vulnerabilities.
- If the project does not meet identified objectives, the MAC will determine what additional measures may be implemented and an assigned individual will be responsible for defining project scope, implementing the project, monitoring success of the project, and making any required modifications to the plan.

Changes will be made to the plan to accommodate for projects that have failed or are not considered feasible after a review for their consistency with established criteria, the time frame, Town priorities, and/or funding resources. Priorities that were identified as potential mitigation strategies will be reviewed as well during the monitoring and update of this plan to determine feasibility of future implementation.

Updating of the plan will be by written changes and submissions, as the MAC deems appropriate and necessary, and as approved by the Sunset Beach Town Council. In keeping with the process of adopting the plan, a public involvement process to receive public comment on plan maintenance and updating will be held once annually, and the final product will be adopted by the Town.

E. Continued Public Involvement

Continued public involvement is also imperative to the overall success of the plan's implementation. The update process provides an opportunity to publicize success stories from plan implementation and seek additional public comment. A public hearing(s) to receive public comment on plan maintenance and updating will be held once within the context of the defined bi-annual review

process. When the MAC reconvenes for updates, they will coordinate with all stakeholders participating in the planning process – including those that joined the committee since the planning process began (if applicable). The plan maintenance and update process will include continued public and stakeholder involvement and input through attendance at designated committee meetings, web postings, and press releases to local media.

F. Incorporation of Existing Planning Mechanisms

The MAC, which meets on a quarterly basis, will provide a mechanism for ensuring that the actions identified in this plan are incorporated into ongoing Town planning activities. Sunset Beach currently utilizes comprehensive land use planning (CAMA plan) and building codes to guide and control development in the Town. After the Town officially adopts the Hazard Mitigation Plan, these existing mechanisms will have hazard mitigation strategies integrated into them, when they are amended and/or updated.

The Town Building Inspections and Zoning department is responsible for administering the buildings codes. After the adoption of the Mitigation Plan, the Town will work with the State Building Code Office to make sure the Town adopts, and is enforcing, the minimum standards established in the new State Building Code. This is to ensure that life/safety criteria are met for new construction.

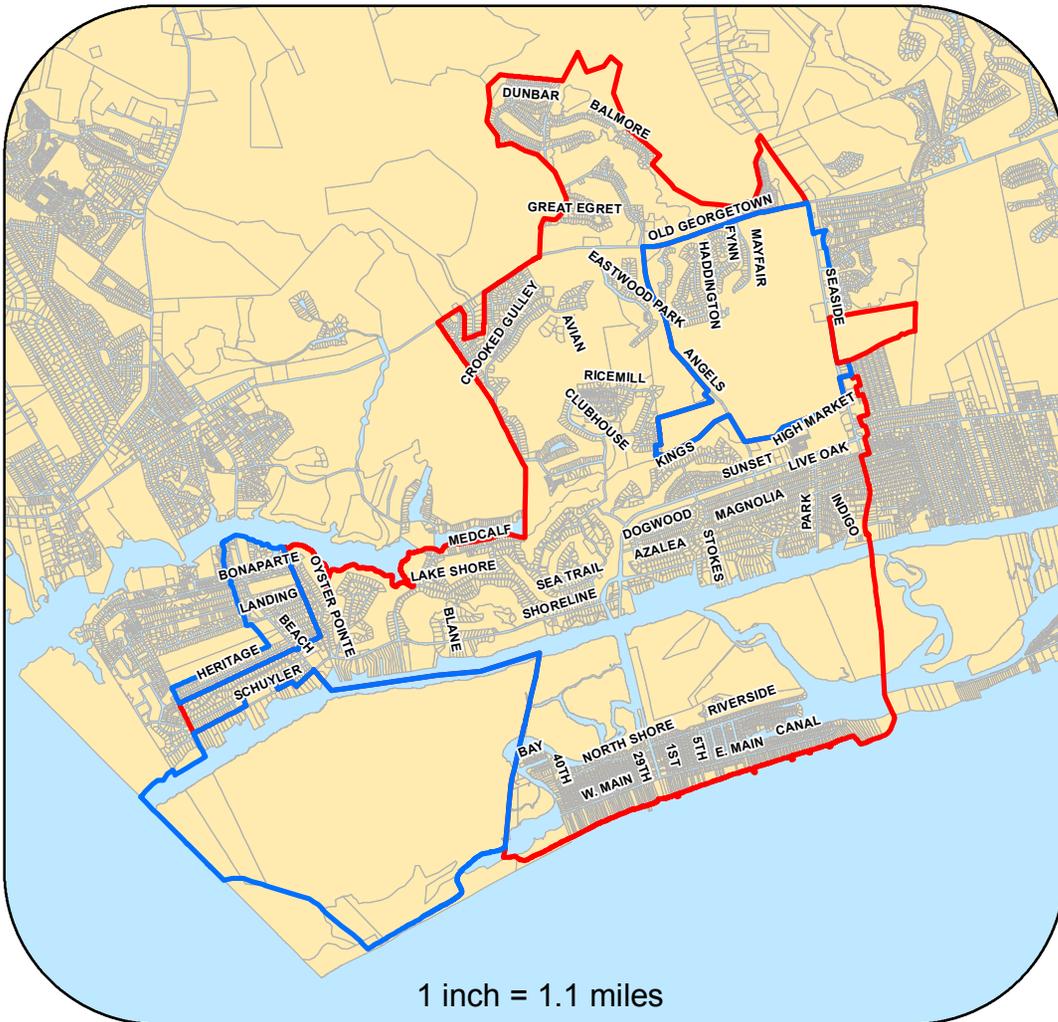
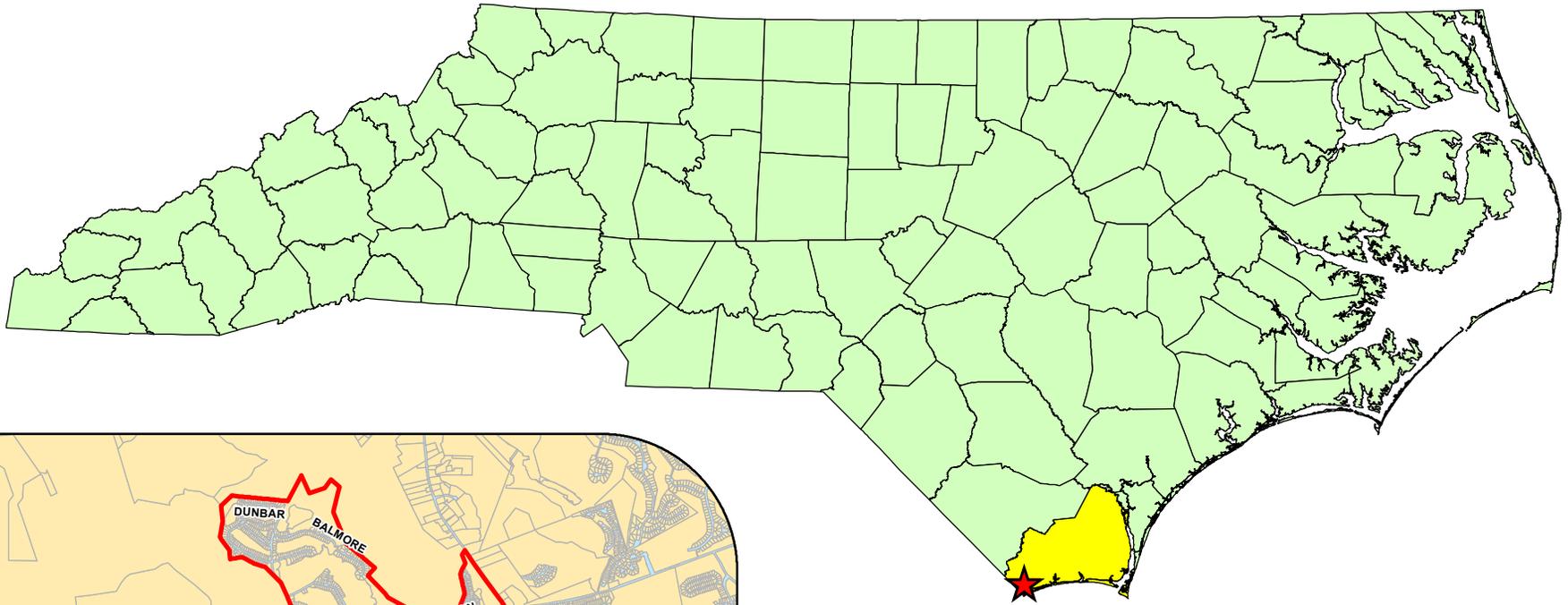
The capital improvement planning that occurs in the future will also contribute to the goals in the Hazard Mitigation Plan. The Town will work with capital improvement planners to secure high-hazard areas for low risk uses.

Within six months of the formal adoption of the Hazard Mitigation Plan, the policies listed above will be incorporated into the process of existing planning mechanisms. In particular, the Town will utilize the recommendations outlined within this plan through the development of a Unified Development Ordinance (UDO). The UDO will address all land development regulations throughout Sunset Beach's corporate limits.

Historically, the Town has utilized its mitigation plan in developing planning documents and while making decisions regarding the development of new public facilities. Since adoption of the 2006 plan, the Town has developed and adopted a CAMA Land Use Plan. The Town will continue to take a proactive approach to incorporating the mitigation plan into day-to-day planning functions, annual capital improvements planning, and long range planning documents.

Appendix A

Maps



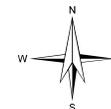
1 inch = 1.1 miles

Map 1



Town of Sunset Beach Hazard Mitigation Plan

Regional Location

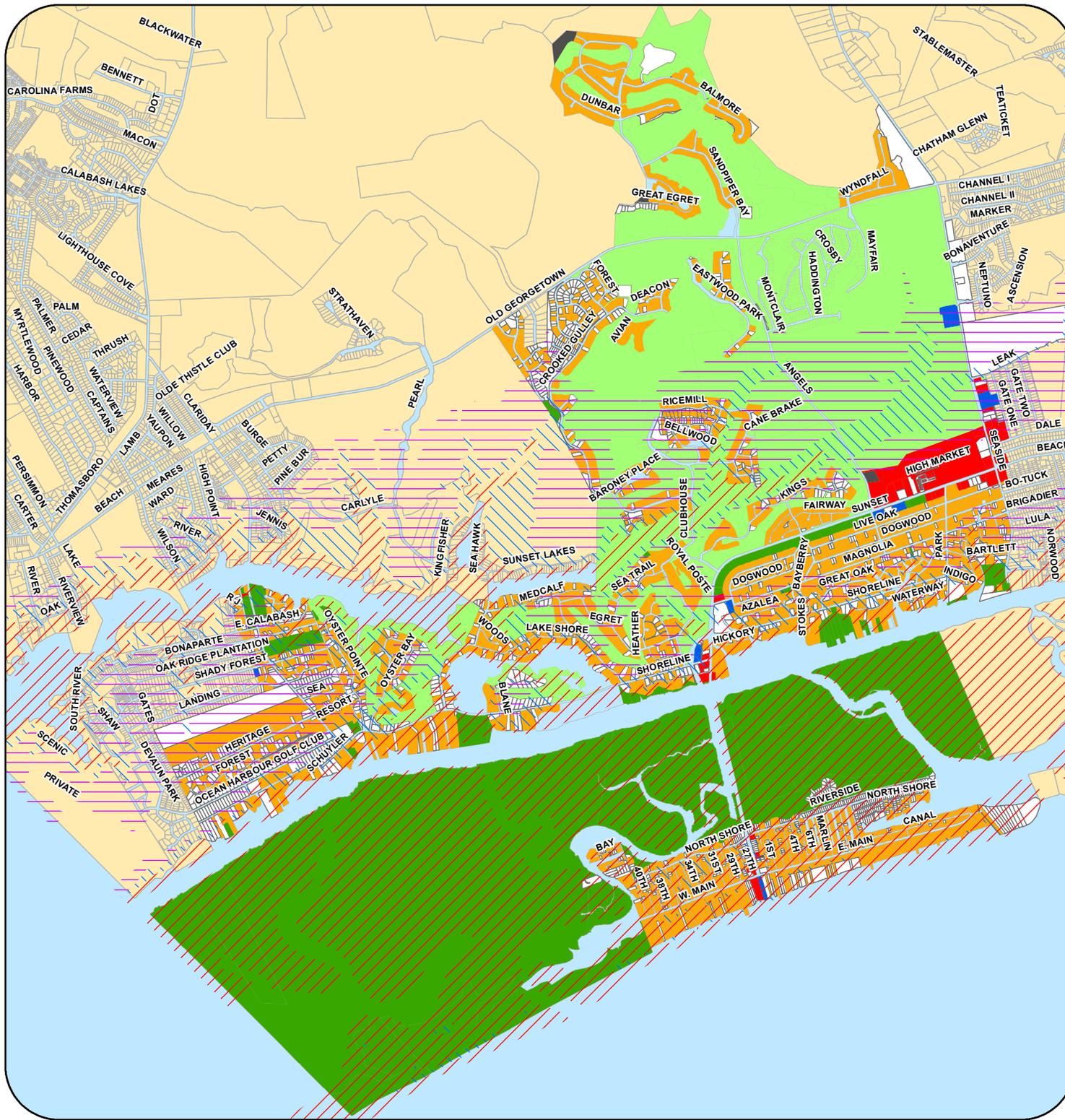


Map 4



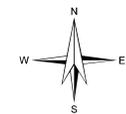
Town of Sunset Beach Hazard Mitigation Plan

Existing Land Use & SLOSH Fast

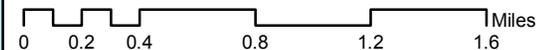


Legend

- County Parcels
- Storm Surge**
- Category 1 & 2
- Category 3
- Category 4 & 5
- Existing Land Use**
- Commercial
- Conservation
- Institutional
- Municipal
- Recreation
- Residential
- Vacant
- Water



1 inch = 3,485 feet



Map 6



Town of Sunset Beach Hazard Mitigation Plan

Critical Facilities

Legend

Critical Facilities

-  BEMC Substation
-  Fire Dept
-  Police Dept/Town Hall
-  Public Works
-  WWTP
-  County Parcels

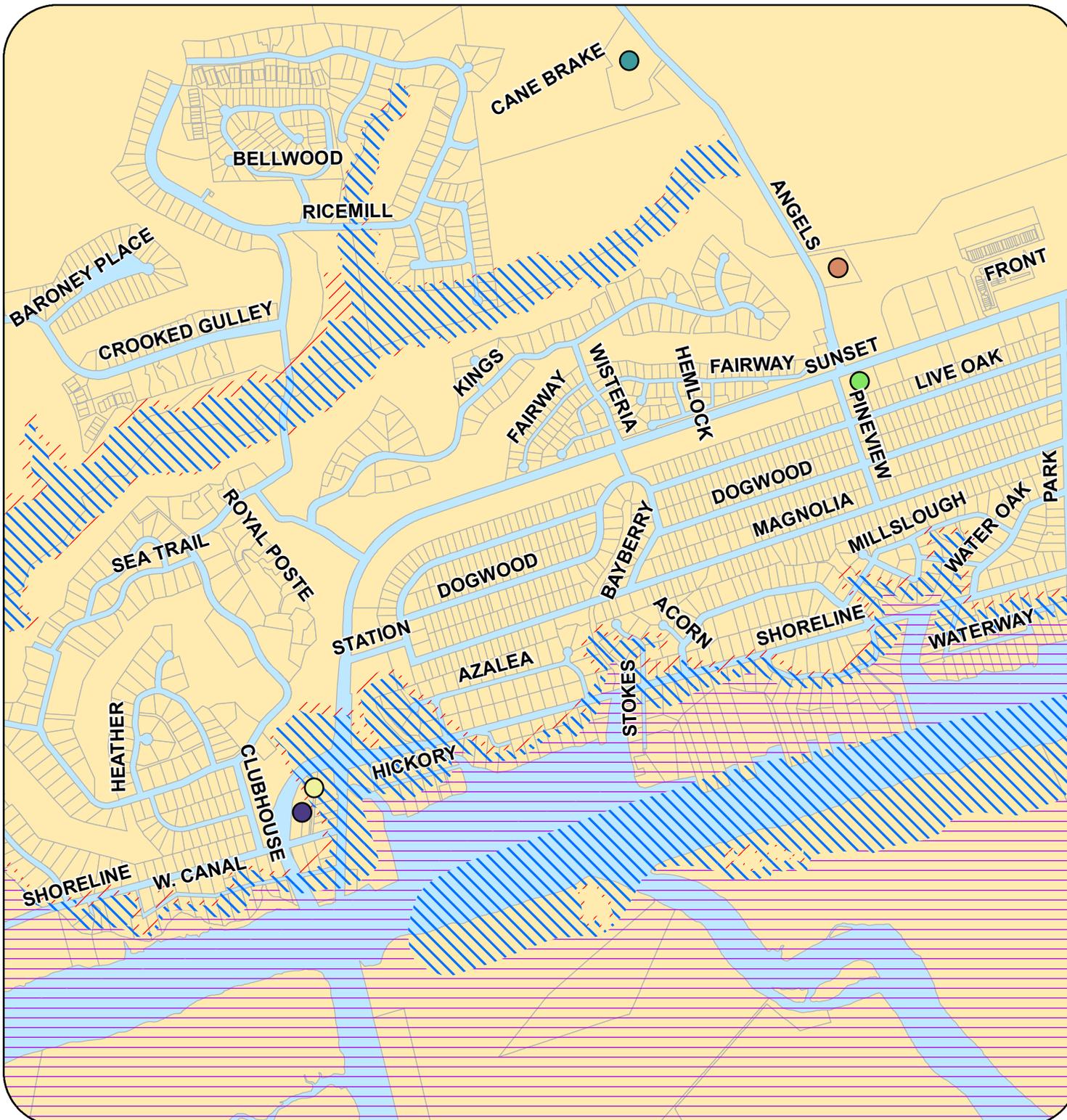
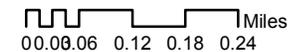
Flood Zones

-  X-500
-  A/AE
-  VE

*Beach accesses were listed as critical facilities, but are not shown on this map.



1 inch = 1,140 feet



Appendix B

MAC Meeting Documentation

	Name	Agency	Address	Email
1	Randy Waters	Town of SSB		RandyWATERS@ATMC.net
2	JEFF CURTIS	Town of SSB		JCurtis@Atmc.net
3	Lisa H. Massey	Town of SSB		Sunsetpolice@atmc.net
4	Chris Barbee	" "		fire@sunsetbeachinc.gov
5	Gary Parker	" "		gparker@atmc.net
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				

	Name	Agency	Address	Email
1	Jeff Cundis	Town of SSB	700 Sunset Blvd.	JCundis@atmc.nc.gov
2	Chris Barbee	SB Fire Dept	102 Shoreline Dr. West	fire@sunsetbeachnc.gov
3	Lisa Massey	Sunset Beach PD	700 Sunset Blvd.	sunsetpolice@atmc.net
4	Gary Parker	Admin	"	gparker@atmc.net
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				

	Name	Agency	Address	Email
1	Lisa Massey	Sunset Beach PD		sunsetpolice@atmc.net
2	Chris Barbee	Sunset Beach F.D		fire@sunsetbeachnc.gov
3	RANDY WALTERS	Building Inspectors/CBS		
4	Terry Curtis	SSB Inspections		
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				

Public Information Meeting

	Name	Agency	Address	Email
1	Jeff Cundis	Town of Sunset Beach	700 Sunset Blvd n. Sunset Beach, NC 28568	JCundis@atmc.net
2	Gary Parker	Town	"	gparker@atmc.net
3	Ronald Klein	Town	"	rkm Klein@atmc.net (no.13)
4	Carol Scott	Caneby Sunset Beach	"	ckscott13@gmail.com
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				

Town of Sunset Beach Hazard Mitigation Public Forum

A Public Meeting will be held by the Sunset Beach Mitigation Advisory Committee at 7:00 PM on Wednesday, July 21, 2010 in the Sunset Beach Council Chambers located at 700 Sunset Boulevard North.

The Mitigation Advisory Committee is a group comprised of town administrative personnel to discuss natural and manmade hazard mitigation as it pertains to Sunset Beach.

All interested parties are invited to attend. The purpose of the meeting is to discuss the hazard mitigation planning process and purpose. The existing Sunset Beach Hazard Mitigation Plan will be updated through this effort in an effort to bring the Town into compliance with State and Federal regulations. We will be discussing mitigation measures that the town may take to improve upon the Town's: resiliency to natural hazards, infrastructure stability, and emergency service provision.

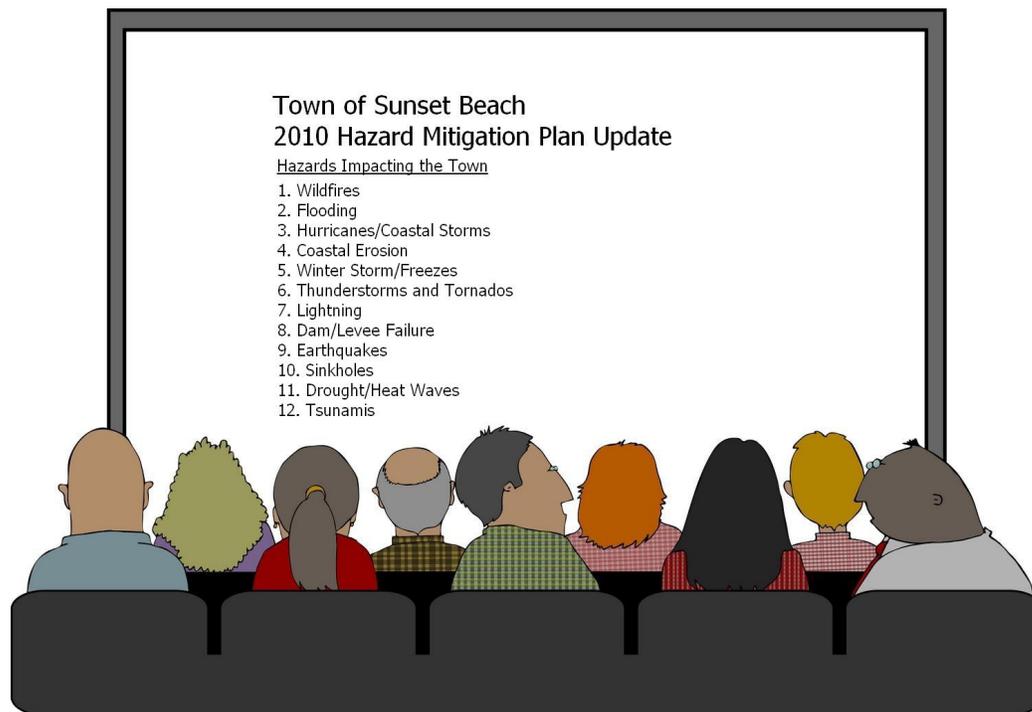
If you have any immediate questions, please contact Jeff Curtis at (910)579-0068. Accommodations for individuals with disabilities or impairments will be made upon request to the extent that reasonable notice is given.

Town of Sunset Beach Hazard Mitigation Plan

The Town of Sunset Beach will conduct a very important meeting to obtain public input to aid in the update of the Town's Hazard Mitigation Plan. Your attendance and support are important!

WHEN: July 21, 2010 at 7:00 P.M.

WHERE: Sunset Beach Town Hall Council Chambers
700 Sunset Blvd. N, Sunset Beach, NC



All interested citizens are encouraged to attend.

Questions? Please contact Jeff Curtis at
(910) 579-6297

Appendix C

NCEM Comments

INSTRUCTIONS FOR USING THE PLAN REVIEW CROSSWALK FOR REVIEW OF LOCAL MITIGATION PLANS

Attached is a Plan Review Crosswalk based on the **Local Multi-Hazard Mitigation Planning Guidance**, published by FEMA in July, 2008. This Plan Review Crosswalk is consistent with the *Robert T. Stafford Disaster Relief and Emergency Assistance Act* (Stafford Act), as amended by Section 322 of the *Disaster Mitigation Act of 2000* (P.L. 106-390), the *National Flood Insurance Act of 1968*, as amended by the *National Flood Insurance Reform Act of 2004* (P.L. 108-264) and *44 Code of Federal Regulations (CFR) Part 201 – Mitigation Planning*, inclusive of all amendments through October 31, 2007.

SCORING SYSTEM

N – Needs Improvement: The plan does not meet the minimum for the requirement. Reviewer’s comments must be provided.

S – Satisfactory: The plan meets the minimum for the requirement. Reviewer’s comments are encouraged, but not required.

Each requirement includes separate elements. All elements of a requirement must be rated “Satisfactory” in order for the requirement to be fulfilled and receive a summary score of “Satisfactory.” A “Needs Improvement” score on elements shaded in gray (recommended but not required) will not preclude the plan from passing.

When reviewing single jurisdiction plans, reviewers may want to put an N/A in the boxes for multi-jurisdictional plan requirements. When reviewing multi-jurisdictional plans, however, all elements apply. States that have additional requirements can add them in the appropriate sections of the *Local Multi-Hazard Mitigation Planning Guidance* or create a new section and modify this Plan Review Crosswalk to record the score for those requirements. Optional matrices for assisting in the review of sections on profiling hazards, assessing vulnerability, and identifying and analyzing mitigation actions are found at the end of the Plan Review Crosswalk.

The example below illustrates how to fill in the Plan Review Crosswalk.:

Assessing Vulnerability: Overview				
<i>Requirement §201.6(c)(2)(ii): [The risk assessment shall include a] description of the jurisdiction’s vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description shall include an overall summary of each hazard and its impact on the community.</i>				
Element	Location in the Plan (section or annex and page #)	Reviewer’s Comments	SCORE	
			N	S
A. Does the new or updated plan include an overall summary description of the jurisdiction’s vulnerability to each hazard?	Section II, pp. 4-10	The plan describes the types of assets that are located within geographically defined hazard areas as well as those that would be affected by winter storms.		<input type="checkbox"/>
B. Does the new or updated plan address the impact of each hazard on the jurisdiction?	Section II, pp. 10-20	The plan does not address the impact of two of the five hazards addressed in the plan. Required Revisions: • Include a description of the impact of floods and earthquakes on the assets. Recommended Revisions: This information can be presented in terms of dollar value or percentages of damage.	<input type="checkbox"/>	
SUMMARY SCORE			<input type="checkbox"/>	

LOCAL MITIGATION PLAN REVIEW SUMMARY

The plan cannot be approved if the plan has not been formally adopted. Each requirement includes separate elements. All elements of the requirement must be rated "Satisfactory" in order for the requirement to be fulfilled and receive a score of "Satisfactory." Elements of each requirement are listed on the following pages of the Plan Review Crosswalk. A "Needs Improvement" score on elements shaded in gray (recommended but not required) will not preclude the plan from passing. Reviewer's comments must be provided for requirements receiving a "Needs Improvement" score.

Prerequisite(s) (Check Applicable Box)	NOT MET	MET
1. Adoption by the Local Governing Body: §201.6(c)(5) OR		X
2. Multi-Jurisdictional Plan Adoption: §201.6(c)(5) AND	N/A	N/A
3. Multi-Jurisdictional Planning Participation: §201.6(a)(3)	N/A	N/A
Planning Process	N	S
4. Documentation of the Planning Process: §201.6(b) and §201.6(c)(1)		X
Risk Assessment	N	S
5. Identifying Hazards: §201.6(c)(2)(i)		X
6. Profiling Hazards: §201.6(c)(2)(i)		X
7. Assessing Vulnerability: Overview: §201.6(c)(2)(ii)		X
8. Assessing Vulnerability: Addressing Repetitive Loss Properties. §201.6(c)(2)(ii)		X
9. Assessing Vulnerability: Identifying Structures, Infrastructure, and Critical Facilities: §201.6(c)(2)(ii)(B)	X	
10. Assessing Vulnerability: Estimating Potential Losses: §201.6(c)(2)(ii)(B)	X	
11. Assessing Vulnerability: Analyzing Development Trends: §201.6(c)(2)(ii)(C)	X	
12. Multi-Jurisdictional Risk Assessment: §201.6(c)(2)(iii)	N/A	N/A

*States that have additional requirements can add them in the appropriate sections of the *Local Multi-Hazard Mitigation Planning Guidance* or create a new section and modify this Plan Review Crosswalk to record the score for those requirements.

SCORING SYSTEM

Please check one of the following for each requirement.

N – Needs Improvement: The plan does not meet the minimum for the requirement. Reviewer's comments must be provided.

S – Satisfactory: The plan meets the minimum for the requirement. Reviewer's comments are encouraged, but not required.

Mitigation Strategy	N	S
13. Local Hazard Mitigation Goals: §201.6(c)(3)(i)		X
14. Identification and Analysis of Mitigation Actions: §201.6(c)(3)(ii)		X
15. Identification and Analysis of Mitigation Actions: NFIP Compliance. §201.6(c)(3)(ii)		X
16. Implementation of Mitigation Actions: §201.6(c)(3)(iii)		X
17. Multi-Jurisdictional Mitigation Actions: §201.6(c)(3)(iv)		X
Plan Maintenance Process	N	S
18. Monitoring, Evaluating, and Updating the Plan: §201.6(c)(4)(ii)		X
19. Incorporation into Existing Planning Mechanisms: §201.6(c)(4)(ii)		X
20. Continued Public Involvement: §201.6(c)(4)(iii)		X
Additional State Requirements*	N	S
Insert State Requirement		
Insert State Requirement		
Insert State Requirement		

LOCAL MITIGATION PLAN APPROVAL STATUS

PLAN NOT APPROVED

See Reviewer's Comments

PLAN APPROVED

LOCAL MITIGATION PLAN REVIEW CROSSWALK Final Brunswick County NC, Town of Sunset Beach September 2010

Local Mitigation Plan Review and Approval Status

Jurisdiction: Town of Sunset Beach	Title of Plan: Town of Sunset Beach Hazard Mitigation Plan	Date of Plan: 9-3-10
Local Point of Contact: Jeff Curtis	Address: 700 Sunset Blvd. North Sunset Beach, NC 28468	
Title: Chief Building Inspector		
Agency: Town of Sunset Beach Inspections		
Phone Number: 910-579-6297	E-Mail: jcurtis@atmc.net	

FEMA Reviewer: Steve Baker Ed Hale (QC) Edwardine S. Marrone (Revisions Review/AR)	Title: Hazard Mitigation Community Planner Hazard Mitigation Community Planner Hazard Mitigation Community Planner	Date: 12/13/2010 January 5, 2011 July 15, 2011
Date Received in FEMA Region IV	11/30/2010	
Plan Not Approved	2/25/2011	
Plan Approved	July 15, 2011	
Date Approved	July 15, 2011	

Jurisdiction:	DFIRM		NFIP Status*			
	In Plan	NOT in Plan	Y	N	N/A	CRS Class
1. Town of Sunset Beach		X	Y			8
2.						
3.						
4.						
5. [ATTACH PAGE(S) WITH ADDITIONAL JURISDICTIONS]						

*** Notes: Y = Participating N = Not Participating N/A = Not Mapped**

PREREQUISITE(S)

1. Adoption by the Local Governing Body

Requirement §201.6(c)(5): [The local hazard mitigation plan shall include] documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval of the plan (e.g., City Council, County Commissioner, Tribal Council).

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE	
			NOT MET	MET
A. Has the local governing body adopted new or updated plan?	Appendix D Section 1, page 1-8	<p>STATE COMMENTS: The plan will be adopted following approval by NCDEM.</p> <p>Page 1-8 states the Plan will be adopted once approved.</p> <p>Required Revision: The Updated Plan must be adopted within one calendar year of FEMA's "Approval Pending Adoption" of the Updated Plan.</p> <p>For more information, please see "Adoption by the Local Governing Body" in the Local Multi-Hazard Mitigation Planning Guidance, pages 17-18</p> <p>7-14-11 Town of Sunset Beach adopted the plan update.</p>		X
B. Is supporting documentation, such as a resolution, included?	Appendix D Section 1, page 1-8	<p>STATE COMMENTS: The plan will be adopted following approval by NCDEM</p> <p>Page 1-8 states the Updated Plan will be adopted once approved.</p> <p>Required Revision: The Updated Plan shall include a copy of the resolution of formal adoption of the Updated Plan dated within one calendar year of FEMA's "Approval Pending Adoption" of the Updated Plan.</p> <p>For more information, please see "Adoption by the Local Governing Body" in the Local Multi-Hazard Mitigation Planning Guidance, pages 17-18</p> <p>7-14-11 Town of Sunset Beach provided adoption resolution for the plan update.</p>		X
SUMMARY SCORE				X

2. Multi-Jurisdictional Plan Adoption

Requirement §201.6(c)(5): For multi-jurisdictional plans, each jurisdiction requesting approval of the plan **must** document that it has been formally adopted.

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE	
			NOT MET	MET
A. Does the new or updated plan indicate the specific jurisdictions represented in the plan?	N/A	STATE COMMENTS: This is a single jurisdiction plan	N/A	N/A
B. For each jurisdiction, has the local governing body adopted the new or updated plan?	N/A	STATE COMMENTS: This is a single jurisdiction plan	N/A	N/A
C. Is supporting documentation, such as a resolution, included for each participating jurisdiction?	N/A	STATE COMMENTS: This is a single jurisdiction plan	N/A	N/A
SUMMARY SCORE			N/A	N/A

3. Multi-Jurisdictional Planning Participation

Requirement §201.6(a)(3): Multi-jurisdictional plans (e.g., watershed plans) may be accepted, as appropriate, as long as each jurisdiction has participated in the process ... Statewide plans will not be accepted as multi-jurisdictional plans.

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE	
			NOT MET	MET
A. Does the new or updated plan describe how each jurisdiction participated in the plan's development?	N/A	STATE COMMENTS: This is a single jurisdiction plan	N/A	N/A
B. Does the updated plan identify all participating jurisdictions, including new, continuing, and the jurisdictions that no longer participate in the plan?	N/A	STATE COMMENTS: This is a single jurisdiction plan	N/A	N/A
SUMMARY SCORE			N/A	N/A

PLANNING PROCESS: §201.6(b): *An open public involvement process is essential to the development of an effective plan.*

4. Documentation of the Planning Process

Requirement §201.6(b): *In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include:*

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

Requirement §201.6(c)(1): *[The plan shall document] the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE	
			N	S
A. Does the plan provide a narrative description of the process followed to prepare the new or updated plan?	Section 1.G, Pages 1-6 to 1-8 Section 1.G, Pages 1-6 to 1-8	STATE COMMENTS: The plan provides a detailed narrative of the process followed to prepare the update including a description of each meeting that was held throughout the process and an account of what was discussed and decided at the meeting. The Town of Sunset Beach hired a consultant who worked closely with the Sunset Beach Building Inspections and Zoning Department for the development of the Plan update. At the initial scoping meeting, a Mitigation Advisory Committee (MAC) was established to oversee the update. Four meetings were held.		X
B. Does the new or updated plan indicate who was involved in the current planning process? (For example, who led the development at the staff level and were there any external contributors such as contractors? Who participated on the plan committee, provided information, reviewed drafts, etc.?)	Section 1.G, pp. 1-6 to 1-8 Section 1, page 1-6 to 1-8	STATE COMMENTS: The plan indicates the participants in the plan update process and, through its description of the process, explains who was charged with particular elements of the update. Participates of the planning process; <ul style="list-style-type: none"> • Consultant (Holland Consulting Planners, Inc.) • Building Inspections and Zoning Department • Town administrator • Police Department • Fire Department/Emergency Management • DOT • ARC • North Carolina Division of Coastal Management MAC reviewed the drafts		X

4. Documentation of the Planning Process

Requirement §201.6(b): In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process **shall** include:

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

Requirement §201.6(c)(1): [The plan **shall** document] the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.

	Location in the		SCORE	
C. Does the new or updated plan indicate how the public was involved? (Was the public provided an opportunity to comment on the plan during the drafting stage and prior to the plan approval?)	<p>Section 1, Pages 1-6 to 1-8</p> <p>Section 1, page 1-7 to 1-8</p> <p>Refer to the March 2011 meeting narrative on Page 1-8.</p>	<p>STATE COMMENTS: The plan explains how the public was involved in the update process and states that, although citizens attended the public meetings, no comments were made to influence the plan.</p> <p>A public input and information meeting was held on July 21, 2010. Several citizens attended but no comments were made. A public hearing <u>will</u> be scheduled to review the final draft plan once the plan has been approved.</p> <p>Required Revision: The updated Plan must indicate how the public was provided an opportunity to comment on the updated Plan’s final draft.</p> <p>For more information, please see “Documentation of the Planning Process” in the Local Multi-Hazard Mitigation Planning Guidance, pages 25-28</p> <p>STATE COMMENTS: The plan will meet this requirement once the plan has been approved by FEMA. 7-14-11 Plan was adopted at a public meeting</p>		X
D. Does the new or updated plan discuss the opportunity for neighboring communities, agencies, businesses, academia, nonprofits, and other interested parties to be involved in the planning process?	<p>Section 1, Page 1-6 to 1-8</p> <p>Section 1, page 1-8</p>	<p>STATE COMMENTS: The plan indicates that no comments were received from any of the other interested parties involved in the planning process.</p> <p>The Updated Plan addresses a review and comment time for Town, Regional Agencies, and NCEM. The draft was distributed to NC DOT, ARC, and NC Coastal Management.</p> <p>Required Revision: The Updated Plan must include statements describing how the neighboring communities, businesses, and academia were involved in the planning process.</p>		X

4. Documentation of the Planning Process

Requirement §201.6(b): *In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include:*

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

Requirement §201.6(c)(1): *[The plan shall document] the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.*

	Location in the		SCORE	
	Refer to the July 2010 meeting narrative on Page 1-7, as well as the accompanying narrative beginning on the middle of page 1-8.	For more information, please see “Documentation of the Planning Process” in the Local Multi-Hazard Mitigation Planning Guidance, pages 25-28 STATE COMMENTS: The plan indicates the participation of several stakeholder groups on pg. 1-8 including NCDOT, American Red Cross and NCDCM. <u>Revision Received:</u> The plan provides the necessary information to fulfill the required elements of this section.		
E. Does the planning process describe the review and incorporation, if appropriate, of existing plans, studies, reports, and technical information?	Section 1, Pages 1-6 Section 1, Pages 1-6	STATE COMMENTS: The plan identifies a number of other plans that were incorporated into the update process including land use, flood damage prevention and zoning. Section 1 paragraph F identifies the following documents which assisted the MAC when compiling the Updated Plan: <ul style="list-style-type: none"> • Land Use Plan • Zoning Ordinance • Flood Damage Prevention Ordinance 		X
F. Does the updated plan document how the planning team reviewed and analyzed each section of the plan and whether each section was revised as part of the update process?	Section 1, Pages 1-3 to 1-5 Section 1, pages 1-4 and 1-5	STATE COMMENTS: The plan describes how each section of the plan was reviewed and what content was included in each section. The Updated Plan describes how the MAC reviewed each section and describes what changed from the original Plan. Examples of the 7 sections are: <ul style="list-style-type: none"> • Section 1, updated participating members of the planning group • Section 2, updated community profile data • Section 3, updated to reflect occurrences of each natural disaster 		X

4. Documentation of the Planning Process

Requirement §201.6(b): *In order to develop a more comprehensive approach to reducing the effects of natural disasters, the planning process shall include:*

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

Requirement §201.6(c)(1): *[The plan shall document] the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how the public was involved.*

Location in the			SCORE	
		<ul style="list-style-type: none"> • Section 4, updated information on capabilities, resources, land development controls, and existing local and state policy programs • Section 5, updated the vulnerability analysis • Section 6, modified existing mitigation strategies • Section 7 on plan maintenance was completely redrafted to reflect current conditions. 		
SUMMARY SCORE				X

LOCAL MITIGATION PLAN REVIEW CROSSWALK Final Brunswick County NC, Town of Sunset Beach September 2010

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

5. Identifying Hazards

Requirement §201.6(c)(2)(i): *[The risk assessment shall include a] description of the type ... of all natural hazards that can affect the jurisdiction.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE	
			N	S
A. Does the new or updated plan include a description of the types of all natural hazards that affect the jurisdiction?	Section 3, Pages 3-1 to 3-21 Section 3, Pages 3-1 to 3-22	STATE COMMENTS: <i>The plan adequately describes all natural hazards that could affect the jurisdiction.</i> The Updated Plan describes the following natural hazards that effect the Town of Sunset Beach: <ul style="list-style-type: none"> • Wildfire/Urban fires • Flooding • Hurricanes/Coastal Storms • Coastal Erosion/Storm Surge • Rip Currents • Winter Storm/Freezes • Thunderstorms and Tornadoes • Lighting • Dam/Levee Failure • Earthquakes • Sinkholes • Drought/Heat Waves • Tsunamis The above list has changed from the Plan 5 years ago to reflect current conditions.		X
SUMMARY SCORE				X

6. Profiling Hazards

Requirement §201.6(c)(2)(i): [The risk assessment **shall** include a] description of the ... location and extent of all natural hazards that can affect the jurisdiction. The plan **shall** include information on previous occurrences of hazard events and on the probability of future hazard events.

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE	
			N	S
A. Does the risk assessment identify the location (i.e., geographic area affected) of each natural hazard addressed in the new or updated plan?	Appendix A, (Map 2) Land Use; (Map 3) Flooding; (Map 4) SLOSH Fast; (Map 5) SLOSH Slow Section 3, pages 2-20 Appendix 1, Maps 3, 4, and 5	STATE COMMENTS: The plan explains that the entire town is subject to the effects of hazard events. The location of each hazard is described on the following pages in the Updated Plan: <ul style="list-style-type: none"> • Wildfire/Urban fires---page 3-2 • Flooding ---Appendix 1, map 3,4, and 5 • Hurricanes/Coastal Storms--- page 3-7 • Coastal Erosion/Storm Surge--- page 3-9 • Rip Currents ---page 3-10 • Winter Storm/Freezes page--- 3-10 & 11 • Thunderstorms and Tornadoes---3-11 to 13 • Lighting---3-13 • Dam/Levee Failure---3-14 & 15 • Earthquakes---3-17 & 18 • Sinkholes---3-18 • Drought/Heat Waves---3-15 & 16 • Tsunamis---3-10 & 20 		X
B. Does the risk assessment identify the extent (i.e., magnitude or severity) of each hazard addressed in the new or updated plan?	Section 5, Page 3-20 (O) Page 3-21 (P) Table 13, Page 3-20; Table 14, Page 3-21 Section 3. page 3-2 to 3-21	STATE COMMENTS: The plan sufficiently describes the extent of each hazard on the jurisdiction, explaining the differences that exist among different areas within the jurisdiction in terms of various hazards. “ Extent ” is a measure of the magnitude or severity of potential hazard events – How bad <u>can</u> it be-- in terms of scientific scales or quantitative measurements. Included in the Updated Plan was; <ul style="list-style-type: none"> • Severe Thunderstorms -wind speed 74 MPH- hail size 3/4 inch • Earthquake- Richter Scale (4.0) • Flood – 6 inches • Coast Erosion- 2 feet per year • Lighting- 1 injury in 1993 		X

	<p>Table 16, page 5-3</p> <p>Refer to the updated narratives for each hazard as follows: Drought: 3-15 Extreme Heat: Removed Sinkholes: 3-19 Dam/Levee: 3-14</p> <p>Extreme Heat was removed from the hazard listing and narrative. This was added in error and was not reflected within the communities existing plan.</p>	<ul style="list-style-type: none"> • Winter storm – See Table 16 • Rip currents - See Table 16 • Wildfires - See Table 16 • Hurricane - See Table 16 <p>The Updated Plan offers no information as to “extent” – A measure of how bad can it be – for the following;</p> <ul style="list-style-type: none"> • Drought---Palmer Drought Severity Index • Extreme Heat---temperature/duration • Sinkholes---dimensions • Dam/Levee Failure--- flood depth <p>Required Revision: The updated Plan must describe the extent of <u>each</u> natural hazard addressed in the Updated Plan. Express “extent” in terms of scientific scales or quantitative measurements. The Updated Plan offers no information as to “extent”for the following;</p> <ul style="list-style-type: none"> • Drought • Extreme Heat • Sinkholes • Dam/Levee Failure <p>Refer to “Local Multi-Hazard Mitigation Planning guidance, July 2008, Requirement 201.6(c)(2)(i), pp. 32-35.</p> <p>STATE COMMENTS: The plan has added information on extent for Drought, Sinkholes and Dam/Levee Failure. Extreme heat was removed from the plan.</p> <p>Drought—FEMA still looking for a “How bad could it be” description. The revised Plan Update describes the Keetch-Bryan scale for measuring drought. If using this scale, apply this scale to the jurisdiction by producing a scale number from 0 to 800.</p> <p>Sinkholes- 36 square feet and a depth of 48 inches Dam/Levee Failure- three foot</p> <p>Requirement Met:</p> <p>Page 3-16 now states” the Town of Sunset Beach would register near zero on the Leetch-Bryan drought intensity scale.</p>	
--	---	---	--

LOCAL MITIGATION PLAN REVIEW CROSSWALK Final Brunswick County NC, Town of Sunset Beach September 2010

<p>C. Does the plan provide information on previous occurrences of each hazard addressed in the new or updated plan?</p>	<p>Section 3, Pages 3-1 to 3-21</p> <p>Section 3, pages 3-2 to 3-20</p>	<p>STATE COMMENTS: The plan provides summary information on each hazard concerning past occurrences. The information included in the plan describes the major events of each type of hazard. Recommendation: You may want to cite Appendix E here.</p> <p>The Updated Plan provides information about previous occurrences for each natural hazard except the following, which no previous events have been recorded for the Town of Sunset Beach:</p> <ul style="list-style-type: none"> • Wildfire • Rip Current • Dam Failure • Earthquake • Sinkhole • Tsunamis 		<p>X</p>
<p>D. Does the plan include the probability of future events (i.e., chance of occurrence) for each hazard addressed in the new or updated plan?</p>	<p>Section 5, Page 3-20 (O) Page 3-21 (P)</p> <p>Table 13, Page 3-20; Table 14, Page 3-21</p>	<p>STATE COMMENTS: The plan addresses the probability of future events via the tables on pages 3-20 and 3-21. Recommendation: You may want to cite 3-22 as well.</p> <p>The Updated Plan uses a Highly Likely, Likely, Possible, and Unlikely scale to determine the probability for each natural hazard addressed. The scale is defined and each natural hazard rated in Table 14.</p>		<p>X</p>
SUMMARY SCORE				<p>X</p>

7. Assessing Vulnerability: Overview

Requirement §201.6(c)(2)(ii): [The risk assessment **shall** include a] description of the jurisdiction’s vulnerability to the hazards described in paragraph (c)(2)(i) of this section. This description **shall** include an overall summary of each hazard and its impact on the community.

Element	Location in the Plan (section or annex and page #)	Reviewer’s Comments	SCORE	
			N	S

LOCAL MITIGATION PLAN REVIEW CROSSWALK Final Brunswick County NC, Town of Sunset Beach September 2010

<p>A. Does the new or updated plan include an overall summary description of the jurisdiction's vulnerability to each hazard?</p>	<p>Section 5, Pages 5-1 to 5-12</p> <p>Section 5, page 5-6 Section 3, table 14, page 3-21</p> <p>Table 16, page 5-3</p> <p>A thorough vulnerability analysis outlining all of this data is provided as follows: Hurricane, Coastal Erosion, Dam/Levee and Tsunamis are covered beginning on Page 5-5 under the heading Flooding.</p> <p>Earthquake and sinkholes are included in the discussion beginning on Page 5-1 under the heading Hazards Impacting the Town Overall.</p> <p>Drought is addressed independently in Section 5.C.3</p>	<p>STATE COMMENTS: The plan explains that the entire jurisdiction is susceptible to many of the hazards discussed in this plan and further describes the types of land uses that might be susceptible as a result.</p> <p>The Updated Plan summarizes the Town of Sunset Beach's vulnerabilities to each hazard as severe or moderate as defined in Table 14. Table 16 summaries structure vulnerability for;</p> <ul style="list-style-type: none"> • Winter Storms • Thunderstorms • Tornadoes • Lightning • Rip currents • Wildfires/urban fires <p>Table 19 summaries structure vulnerability for flooding.</p> <p>Required Revision: The Updated Plan must include by type of hazard, a general description of the type of structures affected by all identified hazards. If no structures are vulnerable, the plan should so note, and identify what is vulnerable – e.g. crops, livestock, timber. Hazards not addressed are:</p> <ul style="list-style-type: none"> • <u>Hurricane</u> • <u>Coast Erosion</u> • <u>Dam</u> • <u>Earthquake</u> • <u>Sinkhole</u> • <u>Drought</u> • <u>Tsunamis</u> <p>Refer to “Local Multi-Hazard Mitigation Planning Guidance, July 2008, Requirement 201.6(c)(2)(ii), pp. 36-38.</p> <p>STATE COMMENTS: The plan addresses the vulnerability of hurricanes, coastal erosion, dam/levee failure and tsunamis under the same heading as flooding since these hazards would likely pose similar threats in terms of vulnerability. Earthquakes and sinkholes are covered under the heading “Hazards Impacting the Town Overall.” Drought is addressed beginning on page 5-8.</p> <p>Revision Received: The plan provides the necessary information to fulfill the required elements of this section.</p>	<p>X</p>
--	---	--	----------

LOCAL MITIGATION PLAN REVIEW CROSSWALK Final Brunswick County NC, Town of Sunset Beach September 2010

B. Does the new or updated plan address the impact of each hazard on the jurisdiction?	Section 5, Pages 5-1 to 5-12	<i>STATE COMMENTS: The plan goes through each of the susceptible land uses located within the jurisdiction and explains the possible impact that would occur if a natural hazard affected the town. The plan also includes monetary valuations based on property values. Recommendation: You might also cite pg 3-21</i>		
	Section 5, Pages 5-1 to 5-12 Section 3, table 14, page 3-21	The Updated Plan addresses the impact of each hazard. The potential impact was estimated by considering the magnitude of the event, how large an area is affected, and the amount of human activity in that area. Table 14 summaries each hazard’s impact as negligible, limited or critical. An example of flooding is: <ul style="list-style-type: none"> • Ranking of 3 for frequency • Ranking of 5 for injuries • Ranking of 4 for deaths • Ranking of 4 for property loss This types flooding at the critical level. Critical is defined as multiple severe injuries, shutdown of critical facilities for 1-2 weeks, and more than 25 percent of property is severely damaged.		X
SUMMARY SCORE				X

8. Assessing Vulnerability: Addressing Repetitive Loss Properties

Requirement §201.6(c)(2)(ii): *[The risk assessment] must also address National Flood Insurance Program (NFIP) insured structures that have been repetitively damaged floods.*

Element	Location in the Plan (section or annex and page #)	Reviewer’s Comments	SCORE	
			N	S
A. Does the new or updated plan describe vulnerability in terms of the types and numbers of <i>repetitive loss properties</i> located in the identified hazard areas?	Section 5, Page 5-12 Section 5, page 5-13	<i>STATE COMMENTS: The plan describes the type and number of repetitive loss structures located within the jurisdiction.</i> The Updated Plan states there are only two residential and zero non-residential repetitive loss structures at Sunset Beach and are equally distributed throughout the Town’s corporate limits. This data is the same as reported in the original Plan.		X
SUMMARY SCORE				X

9. Assessing Vulnerability: Identifying Structures

Requirement §201.6(c)(2)(ii)(A): The plan **should** describe vulnerability in terms of the types and numbers of existing and future buildings, infrastructure, and critical facilities located in the identified hazard area

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE	
			N	S
A. Does the new or updated plan describe vulnerability in terms of the types and numbers of existing buildings, infrastructure, and critical facilities located in the identified hazard areas?	Section 5, 5-1 to 5-12 Section 5, pages 5-1 to 5-13 Appendix A, Map 3 and 6	<p>STATE COMMENTS: The plan summarizes the vulnerability of existing structures and provides assessment based on differences in land use.</p> <p>The updated Plan identifies the types and numbers of existing structures vulnerable to winter storms, thunderstorms/tornadoes, lightning, rip currents, wildfires, flooding, and hurricanes. It does not identify the types and numbers for coastal erosion, dam/levee, earthquake, sinkholes, drought/heat waves, and tsunamis. The Updated Plan does not identify infrastructure or critical facilities vulnerable to the 13 listed hazards.</p> <p>Recommended Revision: In a future update of the Plan, include information as to both the types and numbers of existing structures located in <u>all</u> identified hazard areas. Include infrastructure and critical facilities in the breakdown. If no structures are vulnerable to a specific hazard, the plan should so state. Refer to “Local Multi-Hazard Mitigation Planning guidance, July 2008, Requirement 201.6(c)(2)(ii)(A), pp. 42-44.</p>	X	
B. Does the new or updated plan describe vulnerability in terms of the types and numbers of future buildings, infrastructure, and critical facilities located in the identified hazard areas?	Section 5, 5-1 to 5-12 Section 5, pages 5-1 to 5-13	<p>STATE COMMENTS: The plan does not address the vulnerability of future structures.</p> <p>The Updated Plan describes the vulnerability of future structures for flooding only.</p> <p>Recommended Revision: In a future update of the Plan, include information as to both the types and numbers of future structures located in <u>all</u> identified hazard areas. Include infrastructure and critical facilities in the breakdown. Refer to “Local Multi-Hazard Mitigation Planning guidance, July 2008, Requirement 201.6(c)(2)(ii)(A), pp. 42-44.</p>	X	
SUMMARY SCORE			X	

10. Assessing Vulnerability: Estimating Potential Losses

Requirement §201.6(c)(2)(ii)(B): [The plan **should** describe vulnerability in terms of an] estimate of the potential dollar losses to vulnerable structures identified in paragraph (c)(2)(ii)(A) of this section and a description of the methodology used to prepare the estimate

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE	
			N	S
A. Does the new or updated plan estimate potential dollar losses to vulnerable structures?	Section 5, 5-1 to 5-12 Section 5, pages 5-1 to 5-13	<p>STATE COMMENTS: The plan estimates some dollar loss values in terms of structural tax values.</p> <p>The Updated Plan does not provide any estimated dollar losses for vulnerable structure, existing or future.</p> <p>Recommended Revision: In a future update of the Plan, provide dollar losses for all listed hazards. Provide data for existing and future vulnerable structures.</p> <p>Refer to “Local Multi-Hazard Mitigation Planning guidance, July 2008, Requirement 201.6(c)(2)(ii)(B), pp. 45-46.</p>	X	
B. Does the new or updated plan describe the methodology used to prepare the estimate?	Section 5, 5-1 to 5-12 Section 5, pages 5-1 to 5-13	<p>STATE COMMENTS: The method used to calculate the dollar values is laid out in pages 5-3 and 5-4.</p> <p>The Updated Plan does not provide any estimated dollar losses for vulnerable structure, existing or future. Therefore, no methodology is described.</p> <p>Recommended Revision: In a future update of the Plan, include estimates of potential dollar losses of both existing and future structures located in identified hazard areas, and the methodology used to prepare the estimates.</p> <p>Refer to “Local Multi-Hazard Mitigation Planning guidance, July 2008, Requirement 201.6(c)(2)(ii)(B), pp. 45-46.</p>	X	
SUMMARY SCORE			X	

11. Assessing Vulnerability: Analyzing Development Trends

Requirement §201.6(c)(2)(ii)(C): [The plan **should** describe vulnerability in terms of] providing a general description of land uses and development trends within the community so that mitigation options can be considered in future land use decisions.

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE	
			N	S
A. Does the new or updated plan describe land uses and development trends?	Section 5, Pages 5-1 to 5-12 Section 4, pages 4-12 to 4-15 Section 5, page 5-1	<p>STATE COMMENTS: The plan provides a detailed explanation of land uses and the possible impact of these land uses to hazards. However, there is little information concerning future development trends.</p> <p>The Updated Plan describes their Land Use Plan in detail on pages 4-12 to 4-15. The paragraph on page 5-1, which describes development patterns, focused on current statistics, not future development trends.</p> <p>Recommended Revision: In a future update of the Plan, include future development trends.</p> <p>Refer to "Local Multi-Hazard Mitigation Planning guidance, July 2008, Requirement 201.6(c)(2)(ii)(C), pp. 47-49.</p>	X	
SUMMARY SCORE			X	

12. Multi-Jurisdictional Risk Assessment

Requirement §201.6(c)(2)(iii): For multi-jurisdictional plans, the risk assessment **must** assess each jurisdiction's risks where they vary from the risks facing the entire planning area.

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE	
			N	S
A. Does the new or updated plan include a risk assessment for each participating jurisdiction as needed to reflect unique or varied risks?	N/A	<p>STATE COMMENTS: This is a single jurisdiction plan</p> <p>This is a single jurisdiction plan</p>	N/A	N/A
SUMMARY SCORE			N/A	N/A

LOCAL MITIGATION PLAN REVIEW CROSSWALK Final Brunswick County NC, Town of Sunset Beach September 2010

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

13. Local Hazard Mitigation Goals

Requirement §201.6(c)(3)(i): *[The hazard mitigation strategy shall include a] description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE	
			N	S
A Does the new or updated plan include a description of mitigation goals to reduce or avoid long-term vulnerabilities to the identified hazards?	Section 6, Page 6-1 Section 6, page 6-2 to 6-5	STATE COMMENTS: The plan identifies 11 goals that are broad and intended to reduce long term vulnerabilities to the hazards identified in the plan. The Updated Plan lists the following goals which are the basis for the objectives and strategies for the Town of Sunset Beach: <ul style="list-style-type: none"> • Saving lives and reducing injuries • Preventing or reducing property damage • Reducing economic losses • Minimizing social dislocation and stress • Maintaining critical facilities in functional order • Protecting infrastructure from damage • Protecting mental health • Limiting legal liability of government and public officials • Providing options for political leaders regarding hazard reduction • Fulfilling Federal and State requirements for receipt of future disaster recovery and hazard mitigation assistance • Improve inter-jurisdictional cooperation and coordination, especially regarding the reduction of natural hazard impacts These goals were completely revised/updated from the original Plan.		X
SUMMARY SCORE				X

14. Identification and Analysis of Mitigation Actions

Requirement §201.6(c)(3)(ii): [The mitigation strategy **shall** include a] section that identifies and analyzes a comprehensive range of specific mitigation actions and projects being considered to reduce the effects of each hazard, with particular emphasis on new and existing buildings and infrastructure.

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE	
			N	S
A. Does the new or updated plan identify and analyze a comprehensive range of specific mitigation actions and projects for each hazard?	Section 6, Pages 6-8 to 6-17 Section 6, Table 23, page 6-8 to 6-18	STATE COMMENTS: In Table 23, the plan identifies a number of specific mitigation actions to address the hazards identified in the plan The Updated Plan describes 55 mitigation actions covering all 13 declared hazards. Example: For a flood hazard, there are 24 mitigation actions and for winter storms, there are 8. Four of the mitigation actions cover all hazards (Training, disseminating information, warning system, and communication equipment.) These actions were completely revised/updated from the original Plan.		X
B. Do the identified actions and projects address reducing the effects of hazards on new buildings and infrastructure?	Section 6, Pages 6-8 to 6-17 Section 6, pages 6-8 and 6-14	STATE COMMENTS: The plan provides several actions that will reduce the effects of hazards on new buildings. For example, #31 creates a buffer between new development and frontal dunes. The Update Plan provides two actions that will reduce the effects of hazards on new buildings. For example: <ul style="list-style-type: none"> • Action # 1 Enforce NFIP regulations • Action # 31 create a buffer between new development and frontal dunes 		X
C. Do the identified actions and projects address reducing the effects of hazards on existing buildings and infrastructure?	Section 6, Pages 6-8 to 6-17 Section 6, pages 6-8 and 6-13	STATE COMMENTS: The plan provides several actions that will reduce the effects of hazards on existing buildings. For example, #47 addresses maintenance of streets in the town. The plan provides 11 actions that will reduce the effects of hazards on existing buildings. For example: <ul style="list-style-type: none"> • Action # 2 make all critical facilities disaster resistant • Action # 3 monitor storm drainage facilities to ensure the system is not contributing to flooding issues • Action # 27 provide disaster preparedness information to the public via, news media, website, and the Town's emergency notification system 		X
SUMMARY SCORE				X

LOCAL MITIGATION PLAN REVIEW CROSSWALK Final Brunswick County NC, Town of Sunset Beach September 2010

15. Identification and Analysis of Mitigation Actions: National Flood Insurance Program (NFIP) Compliance

Requirement: §201.6(c)(3)(ii): [The mitigation strategy] must also address the jurisdiction’s participation in the National Flood Insurance Program (NFIP), and continued compliance with NFIP requirements, as appropriate.

Element	Location in the Plan (section or annex and page #)	Reviewer’s Comments	SCORE	
			N	S
A. Does the new or updated plan describe the jurisdiction (s) participation in the NFIP?	Section 4, Pages 4-3 Section 4, page 4-3	<i>STATE COMMENTS:</i> The plan indicates the jurisdiction’s participation in NFIP and explains several strategies it has implemented to improve its participation. On page 4-3, the Updated Plan states “The Town of Sunset Beach participates in the National Flood Insurance Program (NFIP). The ordinance is enforced through the Town’s building permit issuance process.”		X
B. Does the mitigation strategy identify, analyze and prioritize actions related to continued compliance with the NFIP?	Section 6, Pages 6-8 to 6-17 Section 6, page 6-3 to 6-5 and 6-18	<i>STATE COMMENTS:</i> The plan identifies several strategies that it will implement to maintain NFIP compliance as well as actions that it will take to improve its standing in the CRS. The Updated Plan describes several strategies related to continued compliance with the NFIP <ul style="list-style-type: none"> • Strategy # 2 support storm hazard mitigation policies • Strategy # 7 monitor the floodplain requirements of the Flood Damage Prevention Ordinance • Strategy # 9 Request funding for homes damaged during a flood • Strategy # 11 review/revise development ordinances and storm water policies to control runoff • Action # 52 the Town will maintain good standing with both NFIP and CRS 		X
SUMMARY SCORE				X

16. Implementation of Mitigation Actions

Requirement: §201.6(c)(3)(iii): [The mitigation strategy section **shall** include] an action plan describing how the actions identified in section (c)(3)(ii) will be prioritized, implemented, and administered by the local jurisdiction. Prioritization **shall** include a special emphasis on the extent to which benefits are maximized according to a cost benefit review of the proposed projects and their associated costs.

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE	
			N	S
A. Does the new or updated mitigation strategy include how the actions are prioritized ? (For example, is there a discussion of the process and criteria used?)	Section 6, Pages 6-8 to 6-17 Section 6, page 6-6	STATE COMMENTS: The plan includes a description of how actions were prioritized, including process and criteria used. The Updated Plan states “Each implementing action has been provided a priority of low, medium, or high based on a cost benefit review conducted through the planning process. The ranking of priority involved a detailed discussion of cost-benefit review regarding each strategy. Each defined strategy was assessed based on effectiveness and cost, both financial and in-kind. Only strategies deemed achievable based on both factors were considered.”		X
B. Does the new or updated mitigation strategy address how the actions will be implemented and administered, including the responsible department, existing and potential resources and the timeframe to complete each action?	Section 6, Pages 6-8 to 6-17 Section 6, pages 6-8 to 6-18 Section 7, page 7-1 The timeframe for completion is covered under the priority definitions outlined on Page 6-6. A priority designation has been listed for each strategy.	STATE COMMENTS: The plan describes how the mitigation actions will be implemented and administered including the responsible department, resources and timeframe for completion. The Updated Plan describes the following: <ul style="list-style-type: none"> How the actions are to be implemented/administered-- - Page 7-1 states” There are two factors to consider in implementing a mitigation action, the priority of the item and available funding. Thus, pursuing low or no-cost high-priority recommendations will have the greatest likelihood of success. Another important implementation mechanism that is highly effective and low-cost is incorporation of the hazard mitigation plan recommendations and their underlying principles into other municipal plans and regulatory mechanisms, such as Capital Improvements Plans and Land Use Plans. The Town will utilize this plan as a starting point toward implementing policies and programs to reduce losses to life and property from natural hazards.” The MAC is tasked with implementation and maintenance. Responsible department---listed on table 23 for each action 		X

LOCAL MITIGATION PLAN REVIEW CROSSWALK Final Brunswick County NC, Town of Sunset Beach September 2010

		<ul style="list-style-type: none"> • Resources---Appendix G list 22 possible funding sources • Timeframe---An implementation year was included by priority level but no estimated completion date was given. <p>Required Revision: This question was answered completely except for the omission of an estimated timeframe to complete each action.</p> <p>Refer to “Local Multi-Hazard Mitigation Planning guidance, July 2008, Requirement 201.6(c)(3)(iii), pp. 63-64.</p> <p>STATE COMMENTS: As per the explanation on pg 6-6, each action’s timeframe is based on the priority that it was given in Table 23 on pg. 6-8. For each priority definition, there is a clear timeframe for when the action will be implemented.</p> <p>Revision Received: The plan provides the necessary information to fulfill the required elements of this section.</p>		
C. Does the new or updated prioritization process include an emphasis on the use of a cost-benefit review to maximize benefits?	<p>Section 6, Pages 6-8 to 6-17</p> <p>Section 6, page 6-6</p>	<p>STATE COMMENTS: The plan provides a description of the cost-benefit review process and breaks down the factors utilized to conduct the review.</p> <p>The Update Plan states each implementing action has been provided a priority of low, medium, or high based on a cost benefit review conducted through the planning process. The ranking of priority involved a detailed discussion of cost-benefit review regarding each strategy. Each defined strategy was assessed based on effectiveness and cost, both financial and in-kind. Only strategies deemed achievable based on both factors were considered.</p>		X
D. Does the updated plan identify the completed, deleted or deferred mitigation actions as a benchmark for progress, and if activities are unchanged (<i>i.e.</i> , deferred), does the updated plan describe why no changes occurred?	<p>Section 6, Pages 6-3 to 6-5</p> <p>Section 6, pages 6-8 to 6-18 and pages 6-6 to 6-7</p>	<p>STATE COMMENTS: The plan explains whether each action it lists in Table 23 has been completed deleted or deferred and whether or not the strategy is new to the plan as of this update cycle.</p> <p>The Updated Plan includes changes to its strategies and actions. The categories’ are; ongoing/completed, completed, removed, revised, incomplete, eliminated, and new.</p>		X
SUMMARY SCORE				X

17. Multi-Jurisdictional Mitigation Actions

Requirement §201.6(c)(3)(iv): For multi-jurisdictional plans, there **must** be identifiable action items specific to the jurisdiction requesting FEMA approval or credit of the plan.

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE	
			N	S
A. Does the new or updated plan include identifiable action items for each jurisdiction requesting FEMA approval of the plan?	N/A	STATE COMMENTS: The plan is single jurisdiction		X
B. Does the updated plan identify the completed, deleted or deferred mitigation actions as a benchmark for progress, and if activities are unchanged (i.e., deferred), does the updated plan describe why no changes occurred?	N/A	STATE COMMENTS: The plan is single jurisdiction		X
SUMMARY SCORE				X

PLAN MAINTENANCE PROCESS

18. Monitoring, Evaluating, and Updating the Plan

Requirement §201.6(c)(4)(i): [The plan maintenance process **shall** include a] section describing the method and schedule of monitoring, evaluating, and updating the mitigation plan within a five-year cycle.

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE	
			N	S
A. Does the new or updated plan describe the method and schedule for monitoring the plan, including the responsible department?	Section 7, Pages 7-1 to 7-4 Section 7, page 7-2	STATE COMMENTS: The plan provides a clear explanation of the monitoring process including who will be responsible and what will be reviewed by the parties charged with monitoring the plan. The Updated Plan declares monitoring will take place through a formal review by the MAC twice annually.		X
B. Does the new or updated plan describe the method and schedule for evaluating the plan, including how, when and by whom (i.e. the responsible department)?	Section 7, Pages 7-1 to 7-4 Section 7, page 7-2 and 7-3	STATE COMMENTS: The plan identifies the responsible parties for plan evaluation and provides a timeline for the evaluation process. In order to best evaluate any changes in vulnerability, the MAC will use the following process: A representative from the responsible office identified in each mitigation strategy will be responsible for tracking and reporting on a bi-annual basis to the MAC on project status and provide input on		X

LOCAL MITIGATION PLAN REVIEW CROSSWALK Final Brunswick County NC, Town of Sunset Beach September 2010

		whether the project as implemented meets the defined objectives and is likely to be successful in reducing vulnerabilities. If the project does not meet identified objectives, the MAC will determine what additional measures may be implemented and an assigned individual will be responsible for defining project scope, implementing the project, monitoring success of the project, and making any required modifications to the plan.		
C. Does the new or updated plan describe the method and schedule for updating the plan within the five-year cycle?	Section 7, Pages 7-1 to 7-4 Section 7, page 7-2 and 7-3	<p><i>STATE COMMENTS: The plan describes the timeline for updating the plan within the next five year cycle and provides criteria that will be used to analyze the plan when updating it.</i></p> <p>Updating of the plan will be by written changes and submissions, as the MAC deems appropriate and necessary, and as approved by the Sunset Beach Town Council the Plan states .</p>		X
SUMMARY SCORE				X

19. Incorporation into Existing Planning Mechanisms

Requirement §201.6(c)(4)(ii): [The plan shall include a] process by which local governments incorporate the requirements of the mitigation plan into other planning mechanisms such as comprehensive or capital improvement plans, when appropriate.

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE	
			N	S
A. Does the new or updated plan identify other local planning mechanisms available for incorporating the mitigation requirements of the mitigation plan?	Section 7, Page 7-4 Section 1, page 1-6	<p><i>STATE COMMENTS: The plan identifies other planning mechanisms that could incorporate strategies from the mitigation plan including building codes and the land use plan.</i></p> <p>The Updated Plan states the Town's land use plan, zoning ordinance, and flood damage prevention ordinance were used in compiling information for this update. The capital improvement plan will also contribute to the goals in the Update Plan.</p>		X
B. Does the new or updated plan include a process by which the local government will incorporate the mitigation strategy and other information contained in the plan (e.g., risk assessment) into other planning mechanisms, when appropriate?	Section 7, Page 7-4	<i>STATE COMMENTS: The plan describes the process that will be used to incorporate the HMP into planning mechanisms. The MAC will meet quarterly to ensure that actions in the plan are incorporated into planning activities.</i>		X

LOCAL MITIGATION PLAN REVIEW CROSSWALK Final Brunswick County NC, Town of Sunset Beach September 2010

	Section 7, Page 7-4	The Updated Plan states after the Plan is adopted, the land use plan and building codes will have hazard mitigation strategies integrated into them. The Town will work with the State Building Code Office to make sure the Town adopts, and is enforcing, the minimum standards established in the new State Building Code.		
C. Does the updated plan explain how the local government incorporated the mitigation strategy and other information contained in the plan (e.g., risk assessment) into other planning mechanisms, when appropriate?	Section 7, Page 7-4 Section 7, Page 7-4	<p><i>STATE COMMENTS: The plan describes the actions it has taken to incorporate the mitigation strategies in the plan into other planning mechanisms, including the adoption of a CAMA land use plan.</i></p> <p>The Updated Plan states” Since adoption of the 2006 Plan, the Town has developed and adopted a CAMA Land Use Plan. The Town will continue to take a proactive approach to incorporating the mitigation plan into day-to-day planning functions, annual capital improvements planning, and long range planning documents. Historically, the Town has utilized its mitigation plan in developing planning documents and while making decisions regarding the development of new public facilities.</p>		X
SUMMARY SCORE				X

Continued Public Involvement

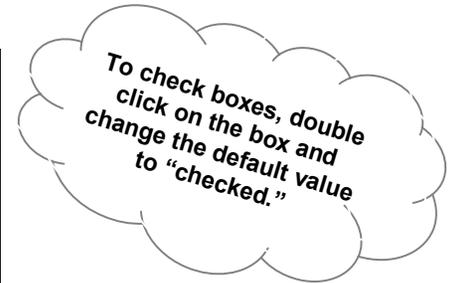
Requirement §201.6(c)(4)(iii): *[The plan maintenance process shall include a] discussion on how the community will continue public participation in the plan maintenance process.*

Element	Location in the Plan (section or annex and page #)	Reviewer's Comments	SCORE	
			N	S
A. Does the new or updated plan explain how continued public participation will be obtained? (For example, will there be public notices, an on-going mitigation plan committee, or annual review meetings with stakeholders?)	Section 7, page 7-1 to 7-4	STATE COMMENTS: The plan explains that public involvement will be acquired through committee meetings, web postings and press releases as well as during a public meeting which will occur once during the bi-annual review period.		
	Section 7, page 7-3	Page 7-3 states the update process provides an opportunity to publicize success stories from plan implementation and seek additional public comment. A public hearing(s) to receive public comment on plan maintenance and updating will be held once within the context of the defined bi-annual review process. The plan maintenance and update process will include continued public and stakeholder involvement and input through attendance at designated committee meetings, web postings, and press releases to local media.		X
SUMMARY SCORE				X

MATRIX A: PROFILING HAZARDS

This matrix can assist FEMA and the State in scoring each hazard. Local jurisdictions may find the matrix useful to ensure that their plan addresses each natural hazard that can affect the jurisdiction. **Completing the matrix is not required.**

Note: First, check which hazards are identified in requirement §201.6(c)(2)(i). Then, place a checkmark in either the N or S box for each applicable hazard. An “N” for any element of any identified hazard will result in a “Needs Improvement” score for this requirement. List the hazard and its related shortcoming in the comments section of the Plan Review Crosswalk.



Hazard Type	Hazards Identified Per Requirement §201.6(c)(2)(i)	A. Location		B. Extent		C. Previous Occurrences		D. Probability of Future Events	
	Yes	N	S	N	S	N	S	N	S
Avalanche	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Coastal Erosion	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Coastal Storm	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dam Failure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Drought	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Earthquake	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Expansive Soils	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Levee Failure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Flood	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hailstorm	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hurricane	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Land Subsidence	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Landslide	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Severe Winter Storm	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tornado	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tsunami	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Volcano	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wildfire	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Windstorm	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Legend:

§201.6(c)(2)(i) Profiling Hazards

- A. Does the risk assessment identify the location (*i.e.*, geographic area affected) of each hazard addressed in the **new or updated** plan?
- B. Does the risk assessment identify the extent (*i.e.*, magnitude or severity) of each hazard addressed in the **new or updated** plan?
- C. Does the plan provide information on previous occurrences of each natural hazard addressed in the **new or updated** plan?
- D. Does the plan include the probability of future events (*i.e.*, chance of occurrence) for each hazard addressed in the plan?

MATRIX B: ASSESSING VULNERABILITY

This matrix can assist FEMA and the State in scoring each hazard. Local jurisdictions may find the matrix useful to ensure that the new or updated plan addresses each requirement. **Completing the matrix is not required.**

Note: First, check which hazards are identified in requirement §201.6(c)(2)(i). Then, place a checkmark in either the N or S box for each applicable hazard. An “N” for any element of any identified hazard will result in a “Needs Improvement” score for this requirement. List the hazard and its related shortcoming in the comments section of the Plan Review Crosswalk. Note: Receiving an N in the shaded columns will not preclude the plan from passing.

To check boxes, double click on the box and change the default value to “checked.”

Hazard Type	Hazards Identified Per Requirement §201.6(c)(2)(i)	A. Overall Summary Description of Vulnerability				B. Hazard Impact				A. Types and Number of Existing Structures in Hazard Area (Estimate)				B. Types and Number of Future Structures in Hazard Area (Estimate)				A. Loss Estimate				B. Methodology			
	Yes	N		S		N		S		N		S		N		S		N		S		N		S	
Avalanche	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Coastal Erosion	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Coastal Storm	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dam Failure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Drought	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Earthquake	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Expansive Soils	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Levee Failure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Flood	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hailstorm	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hurricane	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Land Subsidence	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Landslide	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Severe Winter Storm	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tornado	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tsunami	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Volcano	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wildfire	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Windstorm	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

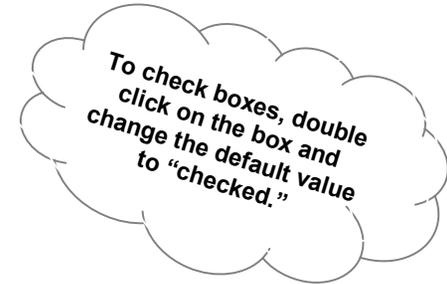
- Legend:**
- §201.6(c)(2)(ii) Assessing Vulnerability: Overview
 - A. Does the **new or updated** plan include an overall summary description of the jurisdiction’s vulnerability to each hazard?
 - B. Does the **new or updated** plan address the impact of each hazard on the jurisdiction?
 - §201.6(c)(2)(ii)(A) Assessing Vulnerability: Identifying Structures
 - A. Does the **new or updated** plan describe vulnerability in terms of the types and numbers of existing buildings, infrastructure, and critical facilities located in the identified hazard areas?
 - B. Does the **new or updated** plan describe vulnerability in terms of the types and numbers of future buildings, infrastructure, and critical facilities located in the identified hazard areas?
 - §201.6(c)(2)(ii)(B) Assessing Vulnerability: Estimating Potential Losses
 - A. Does the **new or updated** plan estimate potential dollar losses to vulnerable structures?
 - B. Does the **new or updated** plan describe the methodology used to prepare the estimate?

MATRIX C: IDENTIFICATION AND ANALYSIS OF MITIGATION ACTIONS

This matrix can assist FEMA and the State in scoring each hazard. Local jurisdictions may find the matrix useful to ensure consideration of a range of actions for each hazard. **Completing the matrix is not required.**

*Note: First, check which hazards are identified in requirement §201.6(c)(2)(i). Then, place a checkmark in either the N or S box for each **applicable** hazard. An “N” for any identified hazard will result in a “Needs Improvement” score for this requirement. List the hazard and its related shortcoming in the comments section of the Plan Review Crosswalk.*

Hazard Type	Hazards Identified Per Requirement §201.6(c)(2)(i)	A. Comprehensive Range of Actions and Projects	
	Yes	N	S
Avalanche	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Coastal Erosion	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Coastal Storm	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dam Failure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Drought	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Earthquake	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Expansive Soils	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Levee Failure	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Flood	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hailstorm	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hurricane	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Land Subsidence	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Landslide	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Severe Winter Storm	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tornado	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Tsunami	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Volcano	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Wildfire	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Windstorm	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



Legend:

§201.6(c)(3)(ii) Identification and Analysis of Mitigation Actions

A. Does the **new or updated** plan identify and analyze a comprehensive range of specific mitigation actions and projects for each hazard?

Appendix D

Public Hearing Documentation/Adoption Resolution

TOWN OF SUNSET BEACH

RESOLUTION ADOPTING THE SUNSET BEACH HAZARD MITIGATION PLAN UPDATE

WHEREAS, the citizens and property within the Town of Sunset Beach are subject to the effects of natural hazards and man-made hazard events that pose threats to lives and cause damages to property and knowledge and experience show that certain areas, i.e., flood hazard areas, are particularly susceptible to flood hazard events; and

WHEREAS, the Town of Sunset Beach desires to seek ways to mitigate situations that may aggravate such circumstances; and

WHEREAS, the Legislature of the State of North Carolina, in Part 6, Article 21 of Chapter 143; Parts 3, 5, and 8 of Article 19 of Chapter 160A; and Article 8 of Chapter 160A of the North Carolina General Statutes, has delegated to local governmental units the responsibility to adopt regulations designed to promote the public health, safety, and general welfare of its citizenry; and

WHEREAS, the Legislature of the State of North Carolina, in Article 1 Chapter 166A of the North Carolina General Statutes (adopted in Session Law 2001-214 – Senate Bill 300 effective July 1, 2001), has stated in Item (a) (2): “For a state of disaster proclaimed pursuant to G.S. 166A-6(a) after August 1, 2002, the eligible entity shall have a hazard mitigation plan approved pursuant to the Stafford Act that is updated every five years”; and

WHEREAS, it is the intent of the Town Council of the Town of Sunset Beach to fulfill this obligation in order that the town will be eligible for federal and state assistance in the event that a state of disaster is declared for a hazard event affecting the town; and

WHEREAS, Section 322 of the Federal Disaster Mitigation Act of 2000 states that local governments must develop an All-Hazards Mitigation Plan and update it every five years in order to receive future Hazard Mitigation Grant Program Funds; and

NOW, THEREFORE, BE IT RESOLVED that the Town Council of the Town of Sunset Beach hereby:

1. Adopts the Town of Sunset Beach Hazard Mitigation Plan; and
2. Vests the Chief Building Inspector, or other appropriate Building Inspections official with the responsibility, authority, and the means to:
 - (a) Inform all concerned parties of this action.
 - (b) Cooperate with Federal, State and local agencies and private firms which undertake to study, survey, map, and identify floodplain or flood-related erosion areas, and cooperate with neighboring communities with respect to management of adjoining floodplain and/or flood-related erosion areas in order to prevent aggravation of existing hazards.
3. Appoints the Chief Building Inspector, or other appropriate official to assure that the Hazard Mitigation Plan is reviewed annually and in greater detail at least once every five years.
4. Agrees to take such other official action as may be reasonably necessary to carry out the strategies outlined within the 2010 Town of Sunset Beach Hazard Mitigation Plan.

Adopted this 4th day of April, 2011.

TOWN OF SUNSET BEACH

Ronald F. Klein
Ronald F. Klein, Mayor

ATTEST:

Lisa H. Anglin
Town Clerk (SEAL)





**TOWN OF SUNSET BEACH
NOTICE OF
PUBLIC HEARING ON THE
2010 HAZARD MITIGATION
PLAN UPDATE**

Notice is hereby given that the Town of Sunset Beach Town Council will conduct a public hearing on April 4, 2011, at 7:00 p.m., in the Town Hall Council Chambers, 700 Sunset Boulevard N, Sunset Beach, NC, to discuss the 2010 Hazard Mitigation Plan Update. Following the public hearing, the Council will consider adoption of the plan. All citizens are encouraged to attend.

A copy of the plan is available for public review at the Sunset Beach Town Hall, 700 Sunset Boulevard N, Sunset Beach, NC. The public is encouraged to review the draft plan.

For questions and/or additional information, please contact Gary Parker, Town Administrator at 910/579-6297.

STATE OF NORTH CAROLINA
COUNTY OF BRUNSWICK

AFFIDAVIT OF PUBLICATION

Before the undersigned, a Notary Public of said County and State, duly commissioned, qualified, and authorized by law to administer oaths, personally appeared

Scott R. Harrell

who, being first duly sworn, deposes and says: that he is

Publisher

(Owner, partner, publisher, or other officer or employee authorized to make this affidavit)

of The Brunswick Beacon, a newspaper published, issued, and entered as periodical mail in the Town of Shallotte in the said County and State; that he is authorized to make this affidavit and sworn statement; that the notice or other legal advertisement, a true copy of which is attached hereto, was published in The Brunswick Beacon on the following date(s):

March 31, 2011

and that the said newspaper in which such notice, paper document or legal advertisement was published, was at the time of each and every such publication, a newspaper meeting all the requirements and qualifications of Section 1-597 of the General Statutes of North Carolina and was a qualified newspaper within the meaning of Section 1-597 of the General Statutes of North Carolina.

This the 31st day of March, 2011.

Scott R. Harrell

(Signature of person making affidavit)

Sworn to and subscribed before me this 31st day of March, 2011.

Dorothy Brennan

(Notary Public)

My commission expires: December 29, 2014.

Appendix E
Hazard Inventory

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD
92 Holden Beach	9/8/1995	1100	Coastal Flood	N/A	0	0	200K	0
93 Holden Beach	9/9/1995	900	Coastal Flood	N/A	0	0	1.2M	0
94 Long Beach	9/9/1995	910	Coastal Flood	N/A	0	0	0	0
172 NCZ087 - 099>100	8/25/1999	10:00 AM	Drought	N/A	0	0	0	0
215 NCZ087 - 096>097 - 099>101	11/15/2001	8:00 AM	Drought	N/A	0	0	0	0
219 NCZ087 - 096>097 - 099>101	6/1/2002	12:00 AM	Drought	N/A	0	0	0	0
62 Statewide	1/15/1994	0	Extreme Cold	N/A	3	0	500K	0
63 Statewide	1/19/1994	0	Extreme Cold	N/A	6	0	0	0
116 Supply	9/11/1996	5:45 AM	Flash Flood	N/A	0	0	0	0
117 Supply	9/11/1996	8:00 AM	Flash Flood	N/A	0	0	0	0
120 Calabash	10/8/1996	5:00 AM	Flash Flood	N/A	0	0	0	0
135 Long Beach	1/23/1998	12:00 PM	Flash Flood	N/A	0	0	0	0
136 Calabash	2/3/1998	7:30 PM	Flash Flood	N/A	0	0	0	0
138 Calabash	2/17/1998	5:30 AM	Flash Flood	N/A	0	0	0	0
150 Phoenix	5/11/1998	5:20 AM	Flash Flood	N/A	0	0	0	0
160 Leland	8/19/1998	3:50 PM	Flash Flood	N/A	0	0	0	0
163 Southport	9/3/1998	3:15 PM	Flash Flood	N/A	0	0	0	0
166 Southport	5/1/1999	5:00 PM	Flash Flood	N/A	0	0	0	0
192 Bolivia	8/4/2000	10:30 AM	Flash Flood	N/A	0	0	0	0
193 Shallotte	9/5/2000	6:30 AM	Flash Flood	N/A	0	0	0	0
194 Shallotte	9/18/2000	11:50 AM	Flash Flood	N/A	0	0	0	0
195 Bolivia	9/21/2000	2:10 PM	Flash Flood	N/A	0	0	0	0
196 Grissettown	9/23/2000	1:37 PM	Flash Flood	N/A	0	0	0	0
199 Long Beach	3/20/2001	5:30 PM	Flash Flood	N/A	0	0	0	0
276 Shallotte	8/31/2006	9:27 PM	Flash Flood	N/A	0	0	0	0
59NCZ001>510	3/23/1993	1200	Flash Floods	N/A	0	0	0	0
173 Southport	8/30/1999	1:45 AM	Flood	N/A	0	0	0	0
176 Leland	9/15/1999	7:30 AM	Flood	N/A	0	0	0	0
177 Calabash	10/17/1999	9:30 AM	Flood	N/A	0	0	0	0
206 Shallotte	6/25/2001	1:45 PM	Flood	N/A	0	0	0	0
207 Shallotte	6/26/2001	5:30 AM	Flood	N/A	0	0	0	0
208 Calabash	7/6/2001	2:30 PM	Flood	N/A	0	0	0	0
210 Supply	7/26/2001	5:15 PM	Flood	N/A	0	0	0	0
211 Leland	8/6/2001	3:00 PM	Flood	N/A	0	0	0	0
70 NCZ095 - 097>098 - 100>101 - 103>104	12/23/1994	930	Flooding	N/A	0	0	0	0
216 NCZ100	11/29/2001	2:00 AM	Fog	N/A	0	2	6K	0
299 Leland	8/27/2008	9:38 AM	Funnel Cloud	N/A	0	0	0K	0K
84 Bolivia	7/3/1995	1430	Funnel Clouds	N/A	0	0	0	0
19BRUNSWICK	5/11/1979	1400	Hail	1.00 in.	0	0	0	0
20BRUNSWICK	7/4/1979	1840	Hail	1.00 in.	0	0	0	0
21BRUNSWICK	4/4/1980	1143	Hail	0.75 in.	0	0	0	0
32BRUNSWICK	4/14/1984	355	Hail	1.75 in.	0	0	0	0
33BRUNSWICK	5/16/1985	1607	Hail	1.00 in.	0	0	0	0
35BRUNSWICK	5/29/1986	1627	Hail	0.75 in.	0	0	0	0
36BRUNSWICK	6/2/1986	1300	Hail	0.75 in.	0	0	0	0
37BRUNSWICK	6/2/1986	1300	Hail	0.75 in.	0	0	0	0
39BRUNSWICK	7/25/1986	1250	Hail	0.75 in.	0	0	0	0
41BRUNSWICK	4/25/1987	1300	Hail	1.00 in.	0	0	0	0
42BRUNSWICK	4/25/1987	1320	Hail	0.75 in.	0	0	0	0
43BRUNSWICK	7/15/1987	1000	Hail	0.75 in.	0	0	0	0
46BRUNSWICK	4/27/1989	2000	Hail	0.75 in.	0	0	0	0

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD
48BRUNSWICK	4/30/1990	1900	Hail	1.00 in.	0	0	0	0
53BRUNSWICK	4/30/1991	1340	Hail	0.75 in.	0	0	0	0
54BRUNSWICK	6/21/1992	1330	Hail	0.75 in.	0	0	0	0
102 Bolivia	3/17/1996	11:20 AM	Hail	0.75 in.	0	0	0	0
105 Leland	6/12/1996	3:30 PM	Hail	0.75 in.	0	0	0	0
106 Leland	6/13/1996	2:27 PM	Hail	1.75 in.	0	0	0	0
109 Leland	7/3/1996	4:10 PM	Hail	1.00 in.	0	0	0	0
110 Ash	7/3/1996	12:40 PM	Hail	1.50 in.	0	0	0	0
124 Bolivia	6/3/1997	12:25 PM	Hail	1.50 in.	0	0	0	0
126 Leland	7/5/1997	9:00 PM	Hail	0.75 in.	0	0	0	0
130 Calabash	8/5/1997	2:15 PM	Hail	1.50 in.	0	0	0	0
131 Shallotte	8/5/1997	2:40 PM	Hail	0.75 in.	0	0	0	0
141 Supply	4/9/1998	7:17 AM	Hail	0.75 in.	0	0	0	0
142 Leland	4/9/1998	7:33 AM	Hail	1.00 in.	0	0	0	0
143 Ash	4/22/1998	3:30 PM	Hail	0.75 in.	0	0	0	0
144 Shallotte	5/4/1998	3:40 PM	Hail	0.75 in.	0	0	0	0
145 Holden Beach	5/4/1998	4:30 PM	Hail	0.75 in.	0	0	0	0
146 Leland	5/4/1998	5:05 PM	Hail	1.25 in.	0	0	0	0
149 Leland	5/8/1998	7:20 PM	Hail	1.00 in.	0	0	0	0
151 Maco	5/17/1998	5:20 PM	Hail	1.25 in.	0	0	0	0
152 Leland	5/23/1998	2:00 PM	Hail	0.75 in.	0	0	0	0
155 Leland	6/13/1998	4:10 PM	Hail	0.75 in.	0	0	0	0
159 Leland	8/19/1998	3:35 PM	Hail	1.00 in.	0	0	0	0
167 Supply	5/14/1999	3:24 PM	Hail	1.75 in.	0	0	0	0
168 Bolivia	5/14/1999	3:43 PM	Hail	1.75 in.	0	0	0	0
169 Long Beach	5/14/1999	3:59 PM	Hail	0.88 in.	0	0	0	0
170 Southport	5/14/1999	4:45 PM	Hail	1.75 in.	0	0	0	0
180 Supply	4/18/2000	12:15 AM	Hail	0.75 in.	0	0	0	0
181 Ash	4/28/2000	2:40 PM	Hail	0.88 in.	0	0	0	0
182 Winnabow	4/28/2000	3:13 PM	Hail	0.75 in.	0	0	0	0
183 Leland	4/28/2000	3:25 PM	Hail	1.00 in.	0	0	0	0
184 Grissettown	4/29/2000	7:55 PM	Hail	0.75 in.	0	0	0	0
186 Holden Beach	5/25/2000	5:25 PM	Hail	0.88 in.	0	0	0	0
187 Leland	5/28/2000	2:10 PM	Hail	0.75 in.	0	0	0	0
188 Caswell Beach	5/28/2000	3:22 PM	Hail	0.75 in.	0	0	0	0
190 Ash	7/16/2000	8:57 PM	Hail	1.75 in.	0	0	0	0
200 Holden Beach	4/1/2001	1:15 PM	Hail	0.75 in.	0	0	0	0
201 Bolivia	4/1/2001	1:30 PM	Hail	0.75 in.	0	0	0	0
203 Ash	5/26/2001	1:05 PM	Hail	1.75 in.	0	0	0	0
204 Leland	5/28/2001	11:43 AM	Hail	1.75 in.	0	0	0	0
205 Shallotte	5/28/2001	12:25 PM	Hail	0.75 in.	0	0	0	0
227 Holden Beach	3/11/2003	10:35 AM	Hail	0.75 in.	0	0	0	0
228 Long Beach	3/11/2003	10:45 AM	Hail	1.00 in.	0	0	0	0
229 Southport	3/11/2003	10:56 AM	Hail	1.00 in.	0	0	0	0
230 Leland	3/11/2003	12:15 PM	Hail	0.75 in.	0	0	0	0
231 Leland	3/11/2003	12:27 PM	Hail	0.75 in.	0	0	0	0
232 Maco	5/3/2003	9:28 PM	Hail	1.00 in.	0	0	0	0
234 Leland	5/31/2003	4:25 PM	Hail	1.25 in.	0	0	0	0
236 Maco	7/12/2003	12:57 PM	Hail	0.75 in.	0	0	0	0
237 Leland	8/23/2003	4:06 PM	Hail	0.88 in.	0	0	0	0
240 Winnabow	6/3/2004	1:35 PM	Hail	0.75 in.	0	0	0	0
241 Leland	6/3/2004	1:45 PM	Hail	0.88 in.	0	0	0	0
242 Leland	6/3/2004	1:50 PM	Hail	0.88 in.	0	0	0	0
244 Leland	6/3/2004	1:55 PM	Hail	1.25 in.	0	0	0	0

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD
262 Southport	4/3/2006	6:15 PM	Hail	1.00 in.	0	0	0	0
263 Shallotte	4/3/2006	7:05 PM	Hail	0.75 in.	0	0	0	0
264 Southport	4/3/2006	7:45 PM	Hail	1.50 in.	0	0	0	0
265 Shallotte	4/3/2006	9:16 PM	Hail	0.88 in.	0	0	0	0
266 Ash	4/8/2006	2:15 PM	Hail	0.88 in.	0	0	0	0
268 Bolivia	6/6/2006	1:58 PM	Hail	1.00 in.	0	0	0	0
269 Leland	6/6/2006	2:45 PM	Hail	0.75 in.	0	0	0	0
270 Ash	6/6/2006	4:45 PM	Hail	0.75 in.	0	0	0	0
271 Calabash	6/8/2006	7:25 PM	Hail	1.75 in.	0	0	0	0
272 Shallotte	6/8/2006	7:45 PM	Hail	0.88 in.	0	0	0	0
274 Leland	8/8/2006	5:00 PM	Hail	0.75 in.	0	0	0	0
280 Supply	6/5/2007	17:53 PM	Hail	1.00 in.	0	0	OK	OK
281 Ash	6/13/2007	14:50 PM	Hail	0.75 in.	0	0	OK	OK
282 Leland	6/25/2007	12:55 PM	Hail	0.75 in.	0	0	OK	OK
283 Maco	7/27/2007	14:40 PM	Hail	0.88 in.	0	0	OK	OK
285 Leland	3/15/2008	18:50 PM	Hail	0.75 in.	0	0	OK	OK
287 North West	4/21/2008	16:55 PM	Hail	0.75 in.	0	0	OK	OK
288 Southport	6/17/2008	18:03 PM	Hail	0.75 in.	0	0	OK	OK
289 Southport	6/17/2008	18:03 PM	Hail	0.88 in.	0	0	OK	OK
292 Bolivia	6/21/2008	8:10 AM	Hail	0.88 in.	0	0	OK	OK
294 Varnum	6/21/2008	8:15 AM	Hail	1.00 in.	0	0	OK	OK
295 Long Beach Arpt	6/21/2008	8:23 AM	Hail	0.88 in.	0	0	OK	OK
296 Southport	6/21/2008	8:38 AM	Hail	0.88 in.	0	0	OK	OK
297 Southport	6/21/2008	8:45 AM	Hail	0.88 in.	0	0	OK	OK
304 Lanvale	5/11/2009	9:17 AM	Hail	1.00 in.	0	0	OK	OK
305 Winnabow	5/11/2009	9:25 AM	Hail	1.00 in.	0	0	OK	OK
224 Shallotte	8/30/2002	4:45 AM	Heavy Rain	N/A	0	0	0	0
245 Leland	7/3/2004	1:45 PM	Heavy Rain	N/A	0	0	0	0
251 Leland	9/1/2004	2:42 PM	Heavy Rain	N/A	0	0	0	0
254 Leland	9/10/2004	7:41 PM	Heavy Rain	N/A	0	0	0	0
261 Shallotte	10/7/2005	8:00 AM	Heavy Rain	N/A	0	0	1.0M	0
278 Winnabow	9/14/2006	4:10 PM	Heavy Rain	N/A	0	0	0	0
307 Leland	8/16/2009	17:30 PM	Heavy Rain	N/A	0	0	OK	OK
308 Holden Beach	12/2/2009	13:30 PM	Heavy Rain	N/A	0	0	OK	OK
313 NCZ100 - 101	2/12/2010	23:00 PM	Heavy Snow	N/A	0	0	OK	OK
255 NCZ100	9/25/2004	2:00 PM	Heavy Surf/high Surf	N/A	1	0	0	0
256NCZ100>101	2/27/2005	10:00 PM	Heavy Surf/high Surf	N/A	0	0	0	0
197 NCZ087 - 097 - 099>101	12/17/2000	8:30 AM	High Wind	52 kts.	0	2	50K	0
198 NCZ097 - 100>101	3/6/2001	11:00 AM	High Wind	50 kts.	0	0	0	0
239NCZ096>097 - 099>101	3/7/2004	9:30 PM	High Wind	57 kts.	0	0	10K	0
57 Shallotte	3/4/1993	530	High Winds	0 kts.	0	0	50K	0
111 NCZ100	7/12/1996	11:00 AM	Hurricane	N/A	0	0	2.0M	9.0M
115 NCZ100	9/5/1996	11:00 AM	Hurricane	N/A	0	0	5.0M	2.0M
161 NCZ100	8/26/1998	6:00 AM	Hurricane	N/A	0	0	35.0M	64.0M
174 NCZ097 - 100>101	8/30/1999	12:00 AM	Hurricane	N/A	0	0	75K	0
175 NCZ097 - 100>101	9/15/1999	5:00 PM	Hurricane	N/A	0	0	109.0M	4.0M
249NCZ096>097 - 099>101	8/14/2004	8:00 AM	Hurricane/typhoon	N/A	0	3	10.4M	2.5M
260 NCZ097 - 100>101	9/14/2005	6:00 AM	Hurricane/typhoon	N/A	0	0	8.3M	0
61 Sunset Beach	9/5/1993	600	Lightning	N/A	0	1	0	0

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD
65 S Portion	7/1/1994	30	Lightning	N/A	0	0	0	0
66 Winnabow	8/5/1994	1900	Lightning	N/A	0	0	50K	0
87 Bolivia	7/21/1995	200	Lightning	N/A	0	0	50K	0
88 Calabash	7/23/1995	600	Lightning	N/A	0	0	60K	0
108 Leland	7/2/1996	4:00 PM	Lightning	N/A	0	0	25K	0
133 Holden Beach	9/18/1997	3:00 PM	Lightning	N/A	0	0	70K	0
189 Shallotte	6/6/2000	1:00 AM	Lightning	N/A	0	0	100K	0
233 Leland	5/31/2003	3:00 PM	Lightning	N/A	0	0	100K	0
246 Shallotte	7/17/2004	1:00 PM	Lightning	N/A	1	0	0	0
258 Long Beach	8/14/2005	10:30 AM	Lightning	N/A	0	0	5K	0
259 Shallotte	8/14/2005	10:30 AM	Lightning	N/A	0	0	15K	0
302 Secession	3/1/2009	10:30 AM	Lightning	N/A	0	0	10K	0K
90 Fort Fisher	8/13/1995	1630	Rip Current	N/A	2	0	0	0
91 Corncake Inlet	9/7/1995	1100	Rip Current	N/A	1	0	0	0
178 NCZ087 - 096>097 - 099>101	1/17/2000	11:00 PM	Snow	N/A	0	0	0	0
118 Calabash	10/8/1996	4:00 AM	Storm Surge	N/A	0	0	0	0
137 Caswell Beach	2/3/1998	11:30 AM	Storm Surge	N/A	0	0	0	0
301 NCZ100	9/6/2008	2:00 AM	Storm Surge/tide	N/A	0	0	490K	0K
310 NCZ100	12/9/2009	8:15 AM	Strong Wind	43 kts.	0	0	1K	0K
312 NCZ100	2/10/2010	13:45 PM	Strong Wind	39 kts.	0	0	2K	0K
74BRUNSWICK	6/7/1995	1515	Thunderstorm Wind	0 kts.	0	0	0	10K
279 Leland	4/15/2007	12:24 PM	Thunderstorm Wind	61 kts.	0	0	150K	0K
290 Longwood	6/20/2008	13:06 PM	Thunderstorm Wind	50 kts.	0	0	0K	0K
291 Varnum	6/21/2008	8:00 AM	Thunderstorm Wind	52 kts.	0	0	0K	0K
293 Piney Grove	6/21/2008	8:10 AM	Thunderstorm Wind	52 kts.	0	0	0K	0K
298 Makatoka	7/31/2008	19:10 PM	Thunderstorm Wind	52 kts.	0	0	0K	0K
306 Varnum	6/26/2009	17:25 PM	Thunderstorm Wind	52 kts.	0	0	4K	0K
309 Bishop	12/2/2009	22:20 PM	Thunderstorm Wind	50 kts.	0	0	2K	0K
311 Shallotte	1/25/2010	5:57 AM	Thunderstorm Wind	52 kts.	0	0	18K	0K
75BRUNSWICK	6/12/1995	1805	Thunderstorm Wind	0 kts. 60 Mph	0	0	0	0
76BRUNSWICK	6/12/1995	1815	Thunderstorm Wind	0 kts. 65mph	0	0	4K	0
79BRUNSWICK	6/12/1995	1845	Thunderstorm Wind	0 kts. 98 Mph	0	0	25K	0
77BRUNSWICK	6/12/1995	1820	Thunderstorm Wind/ Trees	0 kts.	0	0	2K	0
80BRUNSWICK	6/12/1995	1850	Thunderstorm Wind/ Trees	0 kts.	0	0	15K	0
78BRUNSWICK	6/12/1995	1830	Thunderstorm Wind/awning	0 kts.	0	0	2K	0
64BRUNSWICK	5/8/1994	1300	Thunderstorm Winds	0 kts.	0	0	0	0

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD
68 Near Holden Beach	9/18/1994	1655	Thunderstorm Winds	0 kts.	0	0	50K	0
71BRUNSWICK	1/7/1995	500	Thunderstorm Winds	0 kts.	0	0	10K	0
72BRUNSWICK	1/15/1995	400	Thunderstorm Winds	0 kts.	0	0	0	0
73 Exum	3/23/1995	1915	Thunderstorm Winds	0 kts.	0	0	7K	0
85 Leland	7/3/1995	1430	Thunderstorm Winds	0 kts.	0	0	0	0
86 New Hanover	7/3/1995	1620	Thunderstorm Winds	0 kts.	0	0	0	0
100 Southport	11/7/1995	1825	Thunderstorm Winds	0 kts.	0	0	0	0
96 Sunset Beach	11/7/1995	1755	Thunderstorm Winds	0 kts.	0	0	0	0
97 Ocean Isle Beach	11/7/1995	1800	Thunderstorm Winds	0 kts.	0	0	0	0
98 Holden Beach	11/7/1995	1805	Thunderstorm Winds	59 kts.	0	0	0	0
99 Long Beach	11/7/1995	1812	Thunderstorm Winds	58 kts.	0	0	0	0
101 Bolivia	11/11/1995	1950	Thunderstorm Winds	0 kts.	0	0	0	0
69 Near Long Beach	9/18/1994	1745	Thunderstormw Winds	N/A	0	0	0	0
1BRUNSWICK	7/6/1951	1100	Tornado	F1	0	0	25K	0
3BRUNSWICK	6/13/1962	137	Tornado	F2	0	0	25K	0
5BRUNSWICK	9/12/1964	2000	Tornado	F0	0	0	25K	0
11BRUNSWICK	9/7/1975	1445	Tornado	F0	0	0	25K	0
12BRUNSWICK	10/17/1975	1200	Tornado	F1	0	0	25K	0
13BRUNSWICK	5/18/1976	1455	Tornado	F1	0	0	25K	0
14BRUNSWICK	8/16/1976	1330	Tornado	F1	0	0	3K	0
23BRUNSWICK	4/27/1980	1115	Tornado	F0	0	0	0K	0
49BRUNSWICK	5/5/1990	1345	Tornado	F1	0	0	3K	0
67 Longwood	9/18/1994	1645	Tornado	F1	0	0	500K	0
82 Bald Head Island	7/1/1995	1555	Tornado	F0	0	0	0	0
114 Southport	8/4/1996	8:20 AM	Tornado	F0	0	0	0	0
119 Supply	10/8/1996	4:45 AM	Tornado	F0	0	0	100K	0
128 Winnabow	7/19/1997	2:31 PM	Tornado	F0	0	0	0	0
129 Leland	7/19/1997	2:40 PM	Tornado	F0	0	0	2K	0
154 Leland	6/13/1998	4:02 PM	Tornado	F0	0	0	0	0
214 Shallotte	9/11/2001	1:48 PM	Tornado	F0	0	0	0	0
222 Shallotte	7/24/2002	4:55 PM	Tornado	F0	0	0	0	0
252 Southport	9/10/2004	2:28 PM	Tornado	F0	0	0	0	0
253 Long Beach	9/10/2004	2:45 PM	Tornado	F0	0	0	0	0
303 Regan	4/6/2009	10:45 AM	Tornado	F1	0	0	20K	0K
107 NCZ100	6/18/1996	10:00 AM	Tropical Storm	N/A	0	0	0	0
238 NCZ097 - 100>101	9/18/2003	8:00 AM	Tropical Storm	N/A	0	0	0	0
250 NCZ087 - 096 - 099>101	8/29/2004	4:00 PM	Tropical Storm	N/A	0	0	0	0
275 NCZ097 - 099>101	8/31/2006	6:30 PM	Tropical Storm	N/A	0	0	0	4.5M
277 NCZ097 - 099>101	9/1/2006	12:00 AM	Tropical Storm	N/A	0	0	0	0
300 NCZ100	9/6/2008	1:30 AM	Tropical Storm	N/A	0	0	0K	0K

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD
2BRUNSWICK	3/31/1962	2050	Tstm Wind	69 kts.	0	0	0	0
4BRUNSWICK	7/4/1962	1630	Tstm Wind	0 kts.	0	0	0	0
6BRUNSWICK	5/12/1965	1600	Tstm Wind	0 kts.	0	0	0	0
7BRUNSWICK	7/19/1966	1300	Tstm Wind	0 kts.	0	0	0	0
8BRUNSWICK	7/30/1967	1315	Tstm Wind	87 kts.	0	0	0	0
9BRUNSWICK	7/20/1971	1415	Tstm Wind	0 kts.	0	0	0	0
10BRUNSWICK	7/11/1973	1645	Tstm Wind	0 kts.	0	0	0	0
15BRUNSWICK	7/25/1978	2025	Tstm Wind	52 kts.	0	0	0	0
16BRUNSWICK	12/4/1978	2310	Tstm Wind	52 kts.	0	0	0	0
17BRUNSWICK	3/24/1979	140	Tstm Wind	0 kts.	0	0	0	0
18BRUNSWICK	3/24/1979	215	Tstm Wind	0 kts.	0	0	0	0
22BRUNSWICK	4/27/1980	1045	Tstm Wind	0 kts.	0	0	0	0
24BRUNSWICK	8/3/1982	1400	Tstm Wind	56 kts.	0	0	0	0
25BRUNSWICK	4/18/1983	1245	Tstm Wind	0 kts.	0	0	0	0
26BRUNSWICK	7/22/1983	1500	Tstm Wind	61 kts.	0	0	0	0
27BRUNSWICK	7/24/1983	1828	Tstm Wind	50 kts.	0	0	0	0
28BRUNSWICK	7/24/1983	1828	Tstm Wind	51 kts.	0	0	0	0
29BRUNSWICK	3/21/1984	45	Tstm Wind	0 kts.	0	0	0	0
30BRUNSWICK	3/25/1984	730	Tstm Wind	0 kts.	0	0	0	0
31BRUNSWICK	3/25/1984	800	Tstm Wind	0 kts.	0	0	0	0
34BRUNSWICK	7/25/1985	615	Tstm Wind	0 kts.	0	0	0	0
38BRUNSWICK	6/17/1986	1930	Tstm Wind	0 kts.	0	0	0	0
40BRUNSWICK	4/15/1987	1210	Tstm Wind	0 kts.	0	0	0	0
44BRUNSWICK	7/15/1987	1445	Tstm Wind	0 kts.	0	0	0	0
45BRUNSWICK	9/4/1988	1908	Tstm Wind	65 kts.	0	0	0	0
47BRUNSWICK	5/5/1989	2105	Tstm Wind	0 kts.	0	0	0	0
50BRUNSWICK	5/22/1990	1300	Tstm Wind	0 kts.	0	0	0	0
51BRUNSWICK	7/1/1990	1800	Tstm Wind	0 kts.	0	0	0	0
52BRUNSWICK	3/3/1991	1025	Tstm Wind	0 kts.	0	0	0	0
55BRUNSWICK	7/1/1992	1730	Tstm Wind	0 kts.	0	0	0	0
56BRUNSWICK	7/1/1992	1753	Tstm Wind	50 kts.	0	0	0	0
104 Winnabow	4/26/1996	2:20 PM	Tstm Wind	65 kts.	0	0	0	0
112 Leland	7/30/1996	4:20 PM	Tstm Wind	45 kts.	0	0	0	0
121 Southport	10/8/1996	5:20 AM	Tstm Wind	55 kts.	0	0	0	0
122 Supply	2/14/1997	11:50 PM	Tstm Wind	50 kts.	0	0	0	0
127 Leland	7/5/1997	9:10 PM	Tstm Wind	50 kts.	0	0	0	0
134 Long Beach	11/2/1997	2:55 AM	Tstm Wind	55 kts.	0	0	0	0
139 Ash	3/9/1998	3:05 AM	Tstm Wind	65 kts.	0	0	0	0
140 Caswell Beach	3/9/1998	3:24 AM	Tstm Wind	60 kts.	0	0	0	0
147 Leland	5/7/1998	10:40 PM	Tstm Wind	55 kts.	0	0	0	0
148 Bolivia	5/7/1998	11:20 PM	Tstm Wind	65 kts.	0	0	0	0
153 Ash	5/27/1998	12:55 PM	Tstm Wind	60 kts.	0	0	1K	0
156 Supply	6/19/1998	5:55 PM	Tstm Wind	65 kts.	0	0	30K	0
158 Maco	7/31/1998	4:45 PM	Tstm Wind	65 kts.	0	0	50K	0
162 Long Beach	9/3/1998	2:31 PM	Tstm Wind	63 kts.	0	0	0	0
164 Supply	9/3/1998	6:55 PM	Tstm Wind	65 kts.	0	0	0	0
165 Southport	1/3/1999	3:30 AM	Tstm Wind	60 kts.	0	0	0	0
171 Southport	7/6/1999	8:30 AM	Tstm Wind	60 kts.	0	0	10K	0
185 Longwood	5/25/2000	5:10 PM	Tstm Wind	60 kts.	0	0	75K	0
191 Shallotte	7/21/2000	3:57 PM	Tstm Wind	55 kts.	0	0	5K	0
202 Winnabow	4/1/2001	2:30 PM	Tstm Wind	55 kts.	0	0	0	0
212 Longwood	8/29/2001	1:30 PM	Tstm Wind	52 kts.	0	0	0	0
218 Leland	5/10/2002	6:15 PM	Tstm Wind	60 kts.	0	0	0	0
220 Winnabow	6/14/2002	9:15 PM	Tstm Wind	55 kts.	0	0	0	0

Location or County	Date	Time	Type	Mag	Dth	Inj	PrD	CrD
221 Leland	7/20/2002	4:55 PM	Tstm Wind	56 kts.	0	0	10K	0
223 Maco	8/24/2002	9:00 PM	Tstm Wind	55 kts.	0	0	0	0
226 Winnabow	2/22/2003	4:15 PM	Tstm Wind	55 kts.	0	0	0	0
235 Leland	7/9/2003	10:40 PM	Tstm Wind	60 kts.	0	0	0	0
243 Leland	6/3/2004	1:50 PM	Tstm Wind	61 kts.	0	0	0	0
247 Southport	7/17/2004	1:00 PM	Tstm Wind	65 kts.	0	0	0	0
248 Leland	7/17/2004	12:50 PM	Tstm Wind	60 kts.	0	0	0	0
257 Lanvale	3/8/2005	10:36 AM	Tstm Wind	60 kts.	0	0	0	0
267 Winnabow	4/17/2006	4:33 PM	Tstm Wind	60 kts.	0	0	0	0
273 Longwood	7/15/2006	6:40 PM	Tstm Wind	52 kts.	0	0	0	0
123 Shallotte	4/22/1997	11:15 PM	Tstm Wind/hail	0 kts.	0	0	20K	0
132 Seaside	8/5/1997	3:00 PM	Tstm Wind/hail	0 kts.	0	0	25K	0
125 Supply	6/27/1997	1:50 PM	Urban/sml Stream Fld	N/A	0	0	0	0
209 Southport	7/6/2001	3:00 PM	Urban/sml Stream Fld	N/A	0	0	0	0
81 Oak Island	7/1/1995	1542	Waterspout	N/A	0	0	0	0
83 Bald Head	7/1/1995	1604	Waterspout	N/A	0	0	0	0
89 Ocean Isle Beach	8/9/1995	1620	Waterspout	N/A	0	0	0	0
95 5 Se Shallotte Inlet	9/16/1995	1400	Waterspout	N/A	0	0	0	0
103 Long Beach	4/26/1996	2:16 PM	Waterspout	N/A	0	0	0	0
113 Southport	8/4/1996	8:14 AM	Waterspout	N/A	0	0	0	0
157 Caswell Beach	7/5/1998	12:40 PM	Waterspout	N/A	0	0	0	0
213 Shallotte	9/11/2001	1:40 PM	Waterspout	N/A	0	0	0	0
60 Near Southport	8/28/1993	1240	Waterspouts	N/A	0	0	0	0
284 NCZ100	9/25/2007	14:30 PM	Wildfire	N/A	0	0	0K	0K
286 NCZ100	3/28/2008	13:00 PM	Wildfire	N/A	0	0	0K	0K
58 Statewide	3/12/1993	1600	Winter Storm	N/A	2	10	50.0M	0
179 NCZ087 - 096>097 - 099>101	1/25/2000	2:30 AM	Winter Storm	N/A	0	0	0	0
217 NCZ087 - 096>097 - 099>101	1/2/2002	3:00 PM	Winter Storm	N/A	0	0	0	0
225 NCZ087 - 096>097 - 099>101	1/23/2003	5:00 AM	Winter Storm	N/A	0	0	150K	0
TOTALS:					16	18	225.241M	86.010M

Appendix F

MAC Ranking

Town of Sunset Beach
MAC Ranking - Hazard Occurrence Summary

Likelihood of Occurrence

- 4 = Highly Likely
- 3 = Likely
- 2 = Possible
- 1 = Unlikely
- 0 = N/A

Type of Hazard	#1	#2	#3	#4	#5	TOTAL
Wildfires	1	2	2			5
Flooding	4	3	3			10
Hurricanes/Coastal Storms	4	4	4			12
Coastal Erosion	4	4	4			12
Rip Currents	4	4	4			12
Winter Storm/Freezes	1	1	3			5
Thunderstorms & Tornadoes	4	4	2			10
Lightning	4	4	4			12
Dam/Levee Failure	2	1	2			5
Earthquakes	2	1	2			5
Sinkholes	2	1	1			4
Drought/Heat Waves	4	2	4			10
Tsunamis	2	1	1			4

2
3
4
4
4
4
2
3
4
2
2
1
3
1

Town of Sunset Beach
MAC Ranking - Hazard Occurrence Summary

Potential Impact

- 4 = Catastrophic
- 3 = Critical
- 2 = Limited
- 1 = Negligible
- 0 = N/A

Type of Hazard	#1	#2	#3	#4	#5	TOTAL
Wildfires	1	2	1			4
Flooding	4	2	2			8
Hurricanes/Coastal Storms	4	2	2			8
Coastal Erosion	1	2	1			4
Rip Currents	4	2	1			7
Winter Storm/Freezes	1	0	1			2
Thunderstorms & Tornadoes	3	2	3			8
Lightning	3	2	1			6
Dam/Levee Failure	1	0	1			2
Earthquakes	2	1	1			4
Sinkholes	2	2	1			5
Drought/Heat Waves	2	2	1			5
Tsunamis	4	3	2			9

1
3
3
1
2
1
3
2
1
1
2
2
3

Appendix G
Funding Sources

1. Hazard Mitigation Grant Program (HMGP)

The Federal Disaster Assistance Act (Stafford Act) provides funds authorized by the federal government and made available by FEMA for a cost-share program to states. The HMGP provides 75% of the funds while the states provide 25% of the funds for mitigation measures through the post-disaster planning process. The Division of Emergency Management administers the program in this state. The state share may be met with cash or in-kind services. The program is available only for areas affected by a Presidentially-declared disaster.

Contact: NCDEM, 919/715-8000, <http://www.dem.dcc.state.nc.us>

2. Adopt-a-Trail Program

Through the North Carolina Department of Environment and Natural Resources, this program provides grant funding for trail planning, construction, maintenance, and administration.

Contact: NCDENR, 919/846-9991, <http://www.enr.state.nc.us>

3. Assistance to Firefighters Grant Program

Through the Federal Emergency Management Agency, this program provides four grant categories to assist state, local, and tribal Fire Departments with funding necessary for training, equipment purchase, vehicle acquisition, public awareness, code enforcement, arson prevention, and the like.

Contact: FEMA, 866/274-0960, <http://www.usfa.fema.gov/grants>

4. Community Development Block Grant (CDBG) Disaster Recovery Initiative

The CDBG program provides grants to communities for post-disaster hazard mitigation and recovery following a presidential declaration of a Major Disaster of Emergency. Funds can be used for activities such as acquisition, rehabilitation, or reconstruction of damaged properties and facilities and redevelopment of disaster-affected areas. Funds may also be used for emergency response activities, such as debris clearance and demolition and extraordinary increases in the level of necessary public services. HUD provides funds for the CDBG program, and with the help of the Division of Community Assistance administers the program in North Carolina.

5. Clean Water Management Trust Fund

An agency of the North Carolina Department of Environment and Natural Resources (NCDENR), the Clean Water Management Trust Fund (CWMTF) provides grants for enhancement and restoration of degraded waters. In addition, funding is provided for development of buffers and greenways near rivers for environmental, educational, and recreational needs.

Contact: CWMTF, 252/830-3222, <http://www.cwmtf.net>

6. Community Facilities Loans

The US Department of Agriculture (USDA), Rural Housing Service (RHS) provides funding for construction of community facilities for public use.

Contact: USDA, RHS Williamston Area Office, 252/792-7603,
<http://www.rurdev.usda.gov/rhs/index.html>

7. Emergency Management Performance Grant (EMPG)

The purpose of the EMPG is to assist state and local governments in enhancing and sustaining all-hazards emergency management capabilities. Either the State Administrative Agency (SAA) or the state's Emergency Management Agency (EMA) are eligible to apply directly to FEMA for EMPG funds on behalf of state and local emergency management agencies, however, only one application will be accepted from each state or territory.

Contact: FEMA, 800/621-FEMA, <http://www.fema.gov>

8. Flood Insurance

The Federal Emergency Management Agency, Federal Insurance Administration provides the opportunity to purchase flood insurance under the Emergency Program of the National Flood Insurance Program (NFIP).

Contact: NFIP, 888/CALL-FLOOD, ext. 445, <http://www.fema.gov/nfip>

9. Flood Mitigation Assistance Program (FMAP)

This program provides grants for cost-effective measures to reduce or eliminate the long-term risk of flood damage to the built environment and real property. The program's main goal is to reduce repetitive losses to the National Flood Insurance Program. The FMAP is available to eligible communities every year, not just after a Presidentially-declared disaster. Funds for the FMAP are provided by FEMA and the Division of Emergency Management administers the program in North Carolina.

Contact: NCDEM, 919/715-8000, <http://www.dem.dcc.state.nc.us>

10. North Carolina Wetlands Restoration Program

This program, through the North Carolina Department of Environment and Natural Resources (NCDENR), Division of Water Quality, provides in-kind services for the restoration of wetlands and for increased effectiveness of wetland mitigation efforts.

Contact: NCDENR, Division of Water Quality, 919/733-5083,
<http://h2o.ehnr.state.nc.us/wrp>

11. Parks and Recreation Trust Fund (PARTF)

Through the North Carolina Department of Environment and Natural Resources, this program provides matching funds for local parks and recreation public facility development.

Contact: NCDENR, 919/715-2662, <http://www.enr.state.nc.us/>

12. Physical Disaster Loans

The Small Business Administration (SBA) offers loans to victims of declared physical disasters for uninsured losses. The loan limit on these funds may be increased by twenty percent to provide for mitigation measures.

Contact: SBA, 800/827-5722, <http://www.sba.gov/>

13. Property Improvement Loan Insurance

The US Department of Housing and Urban Development (HUD) insures lenders against loss on loans for alterations, repairs and improvements to existing structures and new construction of nonresidential structures.

Contact: HUD, 202/708-1112, <http://www.hud.gov/>

14. Public Assistance Program (PA)

The Public Assistance provides federal aid to communities to help save lives and property in the immediate aftermath of a disaster and to help rebuild damaged facilities. Grants cover eligible costs associated with the repair, replacement, and restoration of facilities owned by state and local governments and nonprofit organizations. The Public Assistance program is administered by FEMA.

Contact: FEMA, <http://www.fema.gov/r-n-r/pa/index.htm>

15. Resource Conservation and Development

The US Department of Agriculture, Natural Resources Conservation Service (NRCS) provides technical and limited financial assistance to communities for resource conservation projects including land conservation, water management, and environmental enhancement.

Contact: NRCS, <http://www.nrcs.usda.gov>

16. River Basin Surveys and Investigations

The US Department of Agriculture, Natural Resources Conservation Service provides technical assistance to local agencies for planning activities to solve problems related to the river basin, including wetland preservation.

Contact: NRCS, <http://www.nrcs.usda.gov>

17. Small Business Administration Disaster Assistance Program

This program provides loans to businesses affected by Presidentially-declared disasters. The program provides direct loans to businesses to repair or replace uninsured disaster damages to property owned by the business, including real estate, machinery and equipment, inventory and supplies. Businesses of any size are eligible. Nonprofit organizations are also eligible. The SBA administers the Disaster Assistance Program.

18. Snagging and Clearing for Flood Control

The Office of the Chief of Engineers, Department of the Army, Department of Defense provides this service in order to reduce flood control.

Contact: <http://www.usace.army.mil>

19. Soil and Water Conservation

The US Department of Agriculture, Natural Resources Conservation Service provides this in-kind service in order to provide for the conservation, development and productive use of the nation's soil, water, and related resources.

Contact: USDA, NRCS, <http://www.nrcs.usda.gov>

20. Urban Park and Recreation Recovery Program

This program of the Department of the Interior, National Park Service (NPS) provides grants for local governments for improvements in park system management and recreational opportunities.

Contact: NPS, 202/565-1200, <http://www.cr.nps.gov/index.htm>

21. Watershed Protection and Flood Prevention Loans

This US Department of Agriculture, Rural Utilities Services (RUS) program provides loans to local organizations for the local share of costs for watershed improvement. Funding includes support for drainage, flood prevention and sedimentation control.

Contact: RUS, <http://www.rurdev.usda.gov/rus/index.html>

22. Watershed Surveys and Planning

The US Department of Agriculture, Natural Resources Conservation Service provides technical and financial assistance for sharing costs of watershed protection measures, including flood prevention, sedimentation control and recreation.

Contact: NRCS, <http://www.nrcs.usda.gov>