Town of Seabrook, NH

Hazard Mitigation Plan 2005

Approved by the

Seabrook Board of Selectmen

And adopted as an official appendix to the Seabrook Emergency Operations Plan

April 27th, 2005

Rockingham
Planning
Commission

This project was partially funded by

NH Bureau of Emergency Management

Seabrook Hazard Mitigation Plan

This plan serves a dual role as a stand alone document approved by the Seabrook Board of Selectmen on April 27th, 2005. The document also serves as an offical annex to the Seabrook Emergency Opperations Plan.

Approved by the Seabrook Board of Selectmen:

______________________, Chair

____

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Date: April 27th, 2005

A True Copy Attest:
Bonnie L. Fowler
Town Clerk
Seabrook, N.H.
03874

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EXECUTIVE SUMMARY

The Seabrook Hazard Mitigation Plan (herein after, the *Plan*) was compiled to assist the Town of Seabrook in reducing and mitigating future losses from natural hazard events. The *Plan* was developed by the Rockingham Planning Commission and participants from the Town of Seabrook and contains the tools necessary to identify specific hazards and aspects of existing and future mitigation efforts.

The following *natural* hazards are addressed:

- Flooding
- Hurricane - High Wind Events
- Severe Winter Weather
- Wildfire
- Earthquakes
- Coastal Storms and Storm Surge

The list of *critical facilities* includes:

- Municpal facilities;
- Communication facilities;
- Fire stations and law enforcement facilities;
- Schools;
- Shelters
- Evacuation routes; and
- Vulnerable Populations

The *Plan* is considered a work in progress and should be revisited frequently to assess whether the existing and suggested mitigation strategies are successful. Copies have been distributed to the Town of Seabrook, and a copy will remain on file at the Rockingham Planning Commission. A copy of this Plan is also on file at the New Hampshire Bureau of Emergency Management (NHBEM) and the Federal Emergency Management Agency (FEMA). This *Plan* was approved by both agencies prior its adoption at the local level.

CHAPTER I. INTRODUCTION

Background

The New Hampshire Bureau of Emergency Management (NH BEM) has a goal for all communities within the State to establish local hazard mitigation plans as a means to reduce and mitigate future losses from natural hazard events. The NH BEM outlined a process whereby communities throughout the State may be eligible for grants and other assistance upon completion of a local hazard mitigation plan. A handbook entitled *Hazard Mitigation Planning for New Hampshire Communities* was created by NH BEM to assist communities in developing local plans. The State's Regional Planning Commissions are charged with providing assistance to selected communities to develop local plans.

The *Plan* was prepared by Rockingham Planning Commission (RPC) with the assistance of participants from the Town of Seabrook, under contract with the New Hampshire Bureau of Emergency Management (BEM) operating under the guidance of Section 206.405 of 44 *CFR* Chapter 1 (10-1-97 Edition). The *Plan* serves as a strategic planning tool for use by the Town of Seabrook in its efforts to identify and mitigate the future impacts of natural and/or man-made hazard events. Upon adoption of this *Plan* by the Seabrook Board of Selectmen, it will become an official appendix to the Seabrook Master Plan.

Methodology

In 2003, the Rockingham Planning Commission (RPC) organized the first meeting with emergency management officials from the Town of Seabrook to begin the initial planning stages of the *Plan*. RPC and participants from the Town developed the content of the *Plan* using the ten-step process set forth in the *Hazard Mitigation Planning for New Hampshire Communities*. The following is a summary of the ten-step process conducted to compile the *Plan.*

Step 1 – Map the Hazards

Areas were identified where damage from historic natural disasters has occurred and areas where critical man-made facilities and other features may be at risk in the future for loss of life, property damage, environmental pollution and other risk factors. RPC generated a set of base maps with GIS (Geographic Information Systems) that were used in the process of identifying past and future hazards.

Step 2 – Identify Critical Facilities and Areas of Concern

Critical Facilities were identified. These included buildings and areas that were considered to be important to the Town for emergency management purposes, were identified for provision of utilities and community services, evacuation routes, and for recreational and social value. Using a Global Positioning System, RPC plotted the exact location of these sites on a map.

Step 3 – Identify Existing Mitigation Strategies

After collecting information on each critical facility in Seabrook, RPC staff identified existing mitigation strategies relative to hazards that may affect the Town.

Step 4 – Identify the Gaps in Existing Mitigation Strategies

The existing strategies were then reviewed by the RPC for coverage and effectiveness, as well as the need for improvement.

Step 5 – Identify Potential Mitigation Strategies

A list was developed of additional hazard mitigation actions and strategies for the Town of Seabrook. Potential actions include improving emergency services (*i.e.*, Increased Drilling and reverse 911) and improved emergency shelters (*i.e.*, evaluating existing shelters and providing emergency generator for all shelters).

Step 6 – Prioritize and Develop the Action Plan

The proposed hazard mitigation actions and strategies were reviewed and each strategy was rated (good, average, or poor) for its effectiveness according to several factors (*e.g.*, technical and administrative applicability, political and social acceptability, legal authority, environmental impact, financial feasibility). Each factor was then scored and all scores were totaled for each strategy. Strategies were ranked by overall score for preliminary prioritization then reviewed again under Step 7.

Step 7 - Determine Priorities

The preliminary prioritization list was reviewed in order to make changes and determine a final prioritization for new hazard mitigation actions and existing protection strategy improvements identified in previous steps. RPC also presented recommendations to be reviewed and prioritized by emergency management officials.

Step 8 - Develop Implementation Strategy

An implementation strategy was developed for the Action Plan which included person(s) responsible for implementation (who), a timeline for completion (when), and a funding source and/or technical assistance source (how) for each identified hazard mitigation actions.

Step 9 - Adopt and Monitor the *Plan*

RPC staff compiled the results of Steps 1 to 8 in a draft document. The draft *Plan* was placed on the RPC website for review by the public, neighboring communities, agencies, businesses, and other interested parties to review and make comments via email. A letter was sent to the abutting communities of Hampton, Hampton Falls, Kensington, South Hampton and Salisbury, MA to insure their opportunity to review the *Plan* prior to finalization. A duly noticed public hearing was held by the Seabrook Board of Selectmen (March 3rd, 2005). This meeting allowed the community to provide comments and suggestions for the *Plan* in person, prior to the document being finalized. The draft was revised to incorporate comment from the Board of Selectmen and general public; then submitted to the NHBEM and FEMA Region I for their review and comments (March 4th, 2005). Any changes required by NHBEM and FEMA were made and a revised draft document was then submitted to the Seabrook Board of Selectmen for their final review and approval. A second public hearing was then held by the Seabrook Board of Selectmen on April 27th, 2005. At this public hearing the *Plan* was approved by the Board of Selectmen, and adopted as an appendix to the Seabrook Emergency Operations Plan.

Hazard Mitigation Goals and Objectives of the State of New Hampshire

The *State of New Hampshire Natural Hazards Mitigation Plan*, which was prepared and is maintained by the New Hampshire Bureau of Emergency Management (NH BEM), sets forth the following related to overall hazard mitigation goals and objectives for the State of New Hampshire:

1. To improve upon the protection of the general population, the citizens of the State and guests, from all natural and man-made hazards.
2. To reduce the potential impact of natural and man-made disasters on the State's Critical Support Services.
3. To reduce the potential impact of natural and man-made disasters on Critical Facilities in the State.
4. To reduce the potential impact of natural and man-made disasters on the State's infrastructure.
5. To improve Emergency Preparedness.
6. Improve the State's Disaster Response and Recovery Capability.
7. To reduce the potential impact of natural and man-made disasters on private property.
8. To reduce the potential impact of natural and man-made disasters on the State's economy.
9. To reduce the potential impact of natural and man-made disasters on the State's natural environment.
10. To reduce the State's liability with respect to natural and man-made hazards generally.
11. To reduce the potential impact of natural and man-made disasters on the State's specific historic treasures and interests as well as other tangible and intangible characteristics which add to the quality of life of the citizens and guests of the State.
12. To identify, introduce and implement cost effective Hazard Mitigation measures so as to accomplish the State's Goals and Objectives and to raise the awareness of, and acceptance of Hazard Mitigation generally.

Through the adoption of this Plan the Town of Seabrook concurs and adopts these goals and objectives.

Acknowledgements

The Town of Seabrook extends special thanks to those that assisted in the development of this *Plan*:

Jeff Brown, Fire Chief
John Starky, Department of Public Works
Joe Titone, Emergency Management Director
Paul Garand, Building Inspector
Scott Bartlatt, Assessor

The Town of Seabrook offers thanks to the **New Hampshire Bureau of Emergency Management** (www.nhBEM.state.nh.us), which provided the model and funding for this document.

In addition, special thanks are extended to the staff of the **Rockingham Planning Commission** for professional services, process facilitation and preparation of this document.

CHAPTER II. NATURAL FEATURES AND COMMUNITY PROFILE

Location, Topography and Environmental Features

Seabrook is located in the Southeastern corner of New Hampshire in Rockingham County. The Town borders the New Hampshire towns of Hampton, Hampton Falls, Kensington and South Hampton. To the south, Seabrook borders on the Massachusetts Town of Salisbury, in Essex County. Seabrook had a population of 7,934 as of the 2000 census, which was up 22% for the 1990 census (US Census). Seabrook was settled in 1638 and incorporated as a separate town in 1768[1].

The Town of Seabrook is approximately 5,978 acres (9.34 square miles), with 318 acres covered in open water. The town is relatively flat with 95% of the land area under 60′ above sea level. The highest point is Grape Hill at 220′ above sea level.

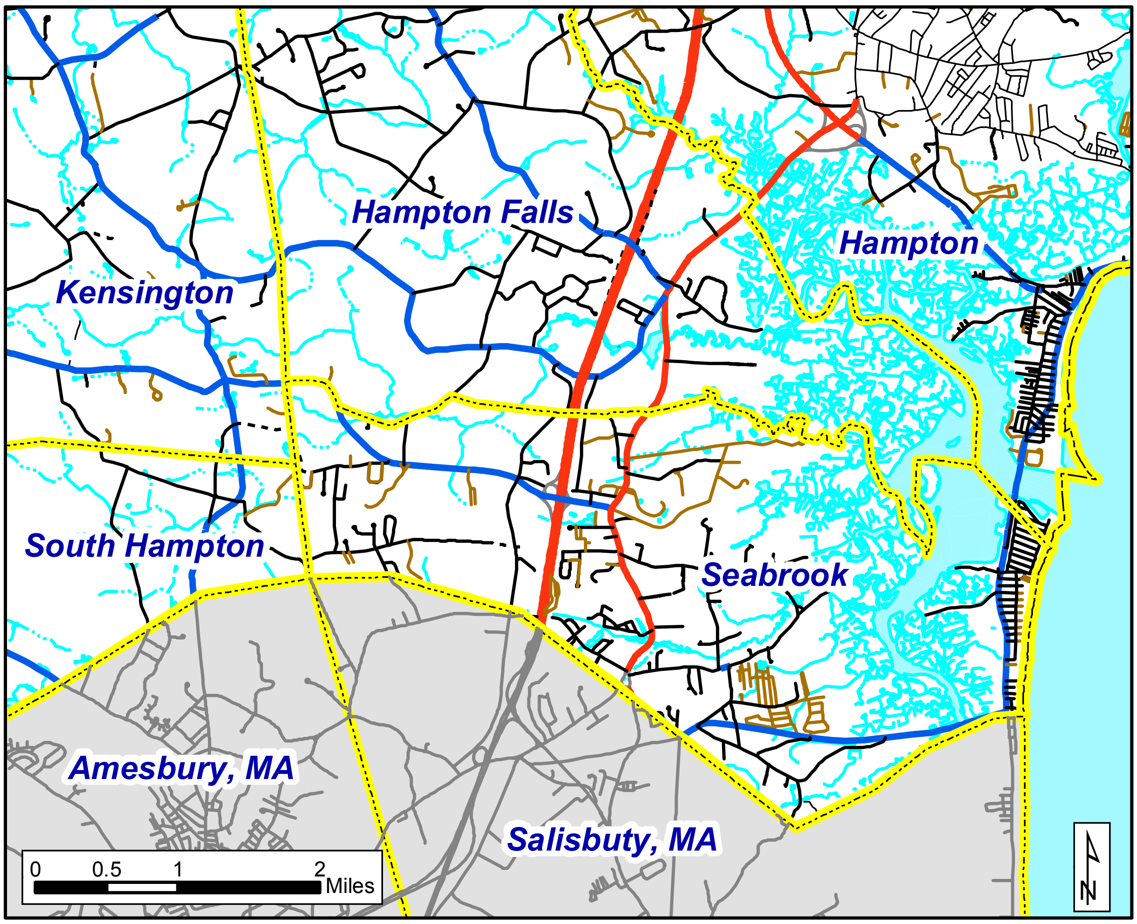

Figure 1: Location Map of Seabrook, New Hampshire

[1] Economic & Labor Info Bureau, NH Employment Security

Watersheds[2]

Seabrook is part of two major watersheds, the Coastal Drainage watershed and the Lower Merrimack River water shed, as can be seen below in Figure 2. These two major drainage basins can be broken down in to six sub-watersheds. The flow of surface waters within these watersheds is generally East to West. The Watersheds of Gove Brook – Hampton Falls River, Brown's River, Rocky Brook – Hunt's Island Creek, and Cain's Brook – Mill Creek all drain from the east to the west and into the Blackwater River – Hampton Harbor watershed which is part of the larger Coastal Drainage Basin. The only watershed within Seabrook that doesn't drain into the Blackwater River – Hampton Harbor is the Lucy Brook – Back River, which drains into the Lower Merrimack River Basin. The Lucy Brook – Back River only covers 179 acres, or 3% of town.

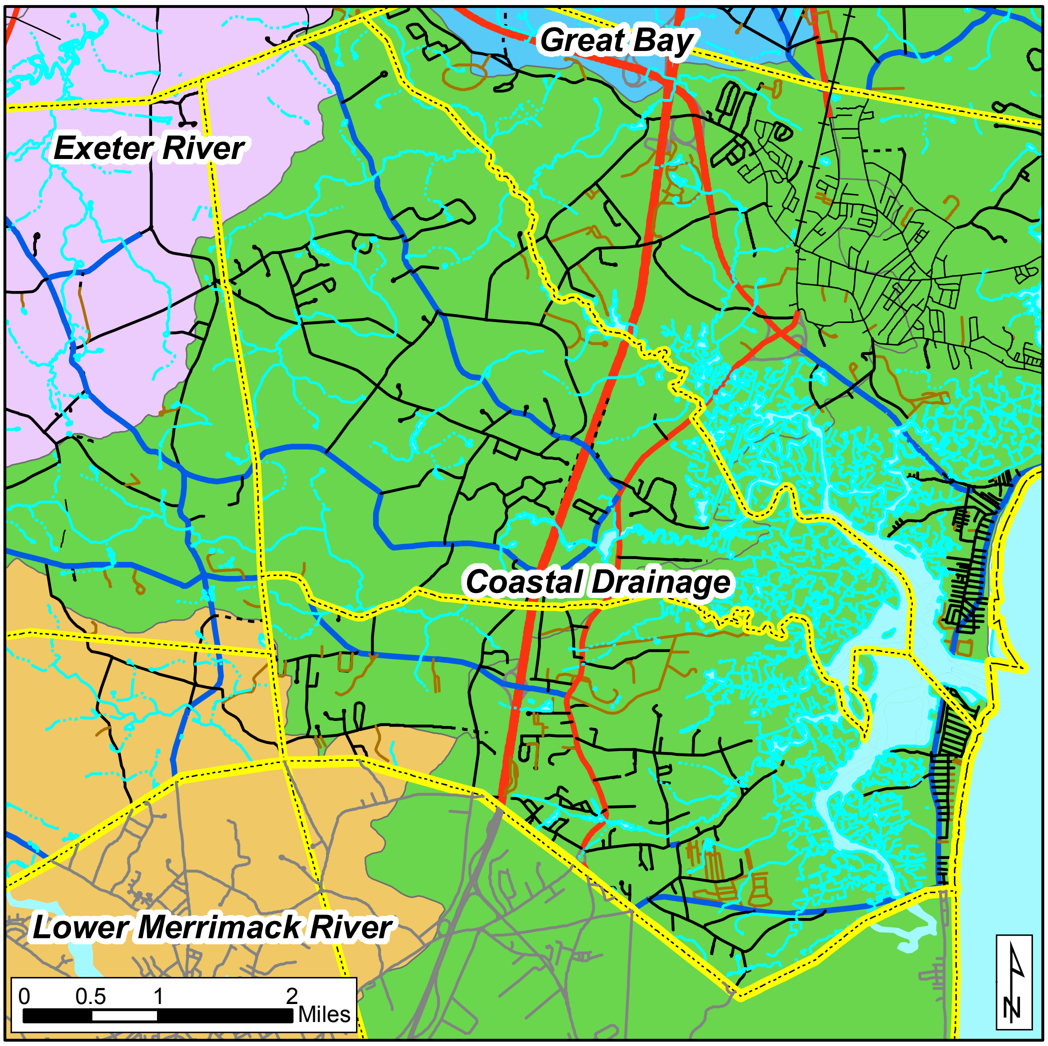

Figure 2: Watersheds, in and near Seabrook, New Hampshire

Wetlands

[2] Seabrook Water Resources Management and Protection Plan 1992

The Town of Seabrook defines wetlands as "an area that is inundated or saturated by surface or ground water at a frequency and duration sufficient to support a prevalence of vegetation typically adapted for life in saturated soil conditions." Seabrook has two distinct wetland environments: tidal and fresh water. Tidal wetlands are dominant covering 1,734 acres, 31% of town, and comprise the largest expanse of this type of wetland in the state. Fresh water wetlands are also very prevalent in Seabrook covering 1,044 acres or 18% of town. Combined, tidal and fresh water wetlands cover 49% of the Town of Seabrook.

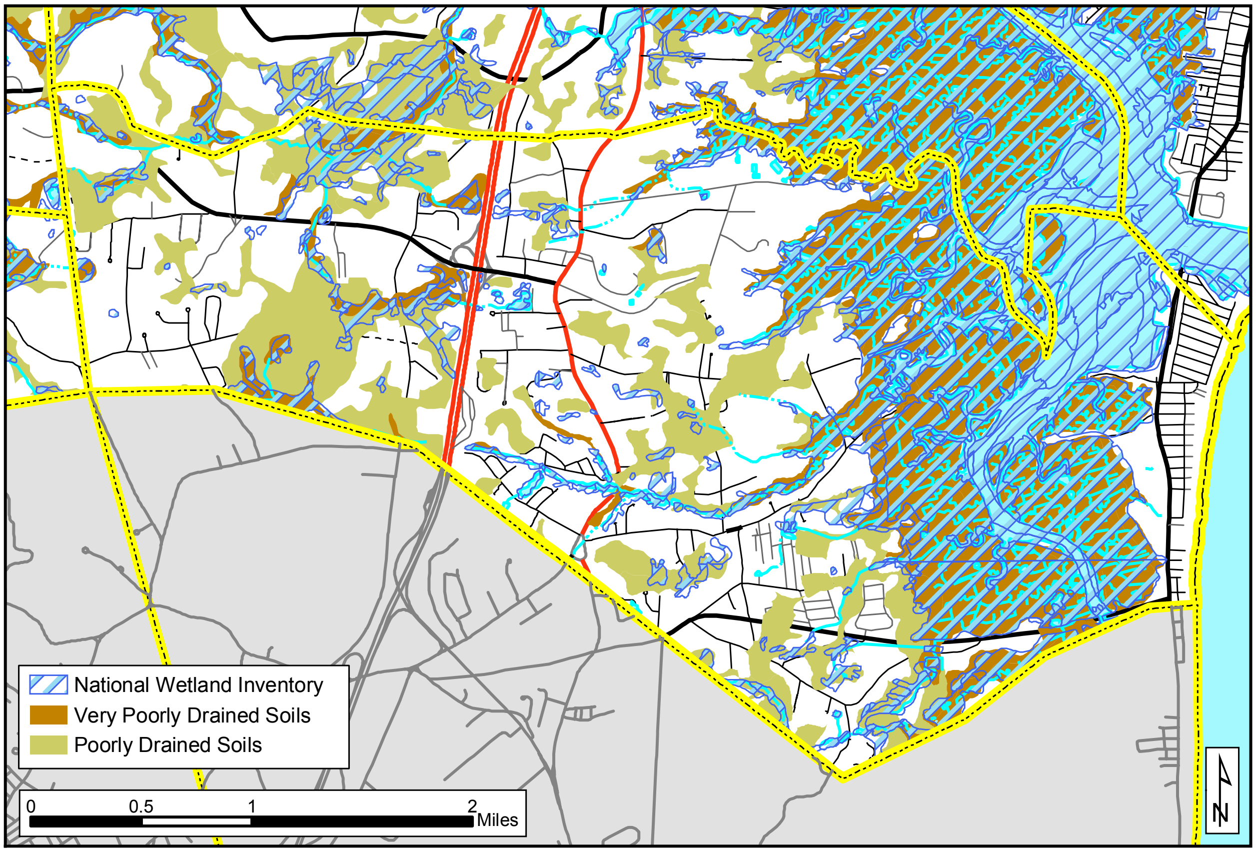

Figure 3: Wetlands Map of Seabrook, New Hampshire. Wetland delineated as poorly and very poorly drained soils, and Wetlands from the National Wetland Inventory.

Floodplains[3]

Seabrook maintains participation in the National Flood Insurance Program administered by the Federal Emergency Management Agency (FEMA). In order to ensure participation in the program, the Town had to revise its floodplain ordinance, which it did in September of 1986 and again in March of 1990.

Development should be located away from wetlands and floodplains whenever possible. The filling of wetlands for building construction not only destroys wetlands and their numerous benefits, but may also lead to groundwater contamination. Building within a flood zone may also

[3] Seabrook Water Resources Management and Protection Plan 1992

reduce the floodplain's capacity to absorb and retain water during periods of excessive precipitation and runoff. Moreover, in regard to building within floodplains, contamination may result from flood damage to septic systems.

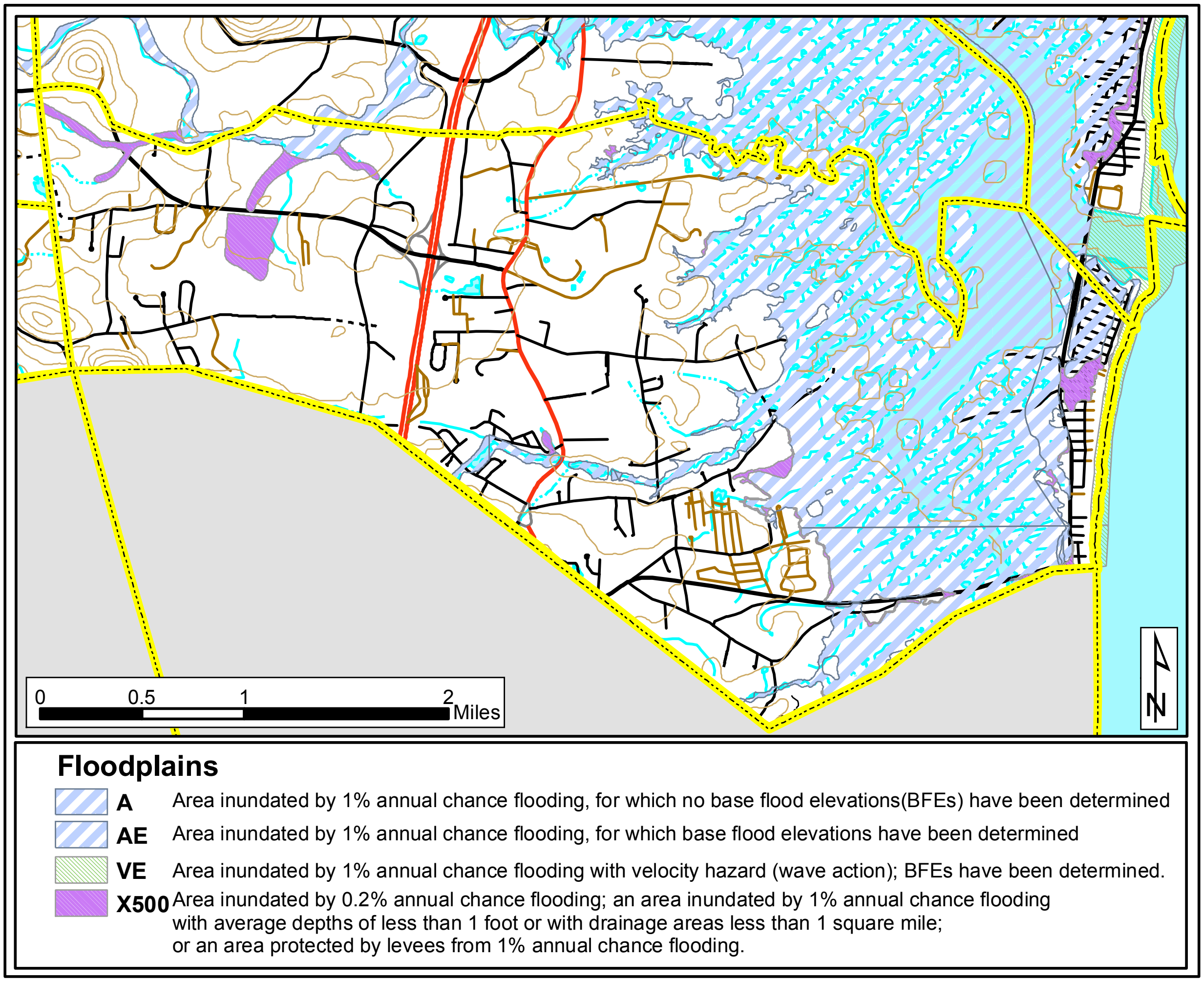

Figure 4: Floodplains of Seabrook, New Hampshire

Current and Future Development

Current land use and development in the Town of Seabrook is dominated by residential uses. Low density housing, mobile homes and apartments make up 64% of the total developed land. Commercial Land makes up 18% and industrial uses make up 11%. The Residential Uses are scattered throughout Town on the available upland areas, also residential homes are packed into the beach area. Commercial uses are most prevalent along Route 1, increasing as you approach Massachusetts. Seabrook Station and the area around it is also a commercial hub in Seabrook. Industrial development is common along the southern half of Route 1 and in pockets east of Interstate 95.

Future development is very likely in the Town of Seabrook. Recently Seabrook installed a municipal sewer system for the entire Town. This will allow for denser residential uses. The 2000 Master Plan recommends three levels of residential density: low, medium and high. Low density would be located east of Batchelder Road and Stard Road. These roads run parallel to Interstate 95, less than 1000 feet to the east. High density residential would be located in the beach area and the rest of the residential area would be medium density residential. The 2000 Master Plan also calls for wise use and protection of surface waters, wetlands, and aquifers.

Below is a map of Seabrook current Zoning Districts. A Land use map was also prepared for this *Plan* and is displayed as Map 1: Land Use.

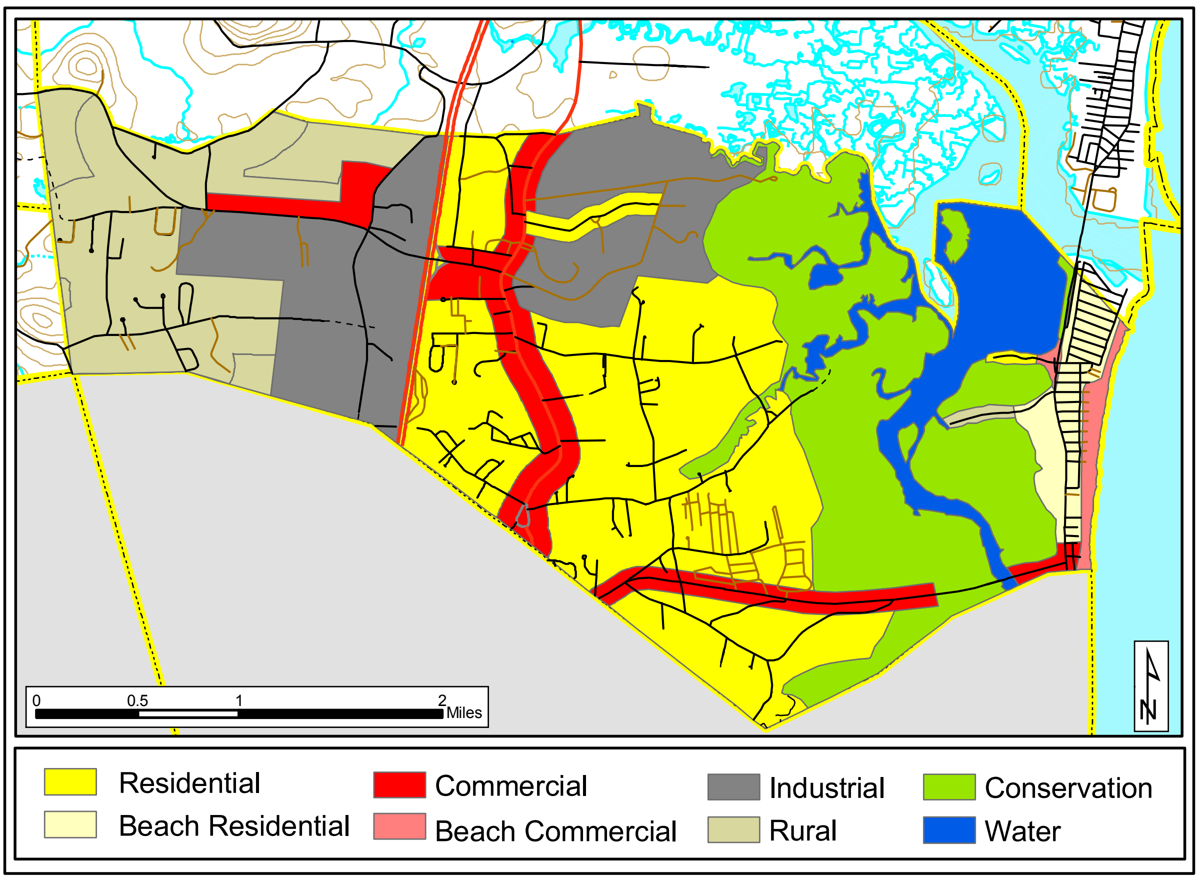

Figure 5: Seabrook Zoning Districts

CHAPTER III. HAZARDS IN THE TOWN OF SEABROOK

What are the Hazards?

The first step in planning for natural hazard mitigation is to identify hazards that may affect the Town. Some communities are more susceptible to certain hazards (i.e., flooding near rivers, hurricanes on the seacoast, etc.). The Town of Seabrook is prone to several types of natural hazards. These hazards include: flooding, hurricanes or other high-wind events, severe winter weather, wildfires, earthquakes, and coastal storms. Coastal storms are not defined separately in the next section (definition of natural hazards) because of their diverse affects they are defined under multiple hazards (flooding, hurricanes-high wind events, and severe winter weather). Other natural hazards can and do affect the Town of Seabrook, but these were the hazards prioritized for mitigation planning. These hazards were considered to occur with regularity and/or to have high damage potential, and are discussed below.

Natural hazards that are included in the State's Hazard Mitigation Plan that are not included in this *Plan* include: drought, extreme heat, landslide, subsidence, radon and avalanche. Subsidence and avalanche are rated by the State as having *Low* and *No* risk in Rockingham County, respectively; due to this they were left out of the *Plan*. Seabrook has no record of landslides and little chance of one occurring that could possibly damage property of cause injury; so landslides were not included in this *Plan*. The State's Plan indicates that Rockingham County is at Moderate risk to drought, extreme heat, and radon; these hazards were not included in this *Plan*. When compared to natural hazards that could be potentially devastating to the Town (earthquakes or hurricanes) or natural hazards that occur with regularity (flooding or severe winter weather) it was not considered an effective use of time to include drought, extreme heat, and radon in the *Plan* at this time. When the *Plan* is revised and updated in the future, possible inclusion of these hazards will be reevaluated.

Definitions of Natural Hazards

Flooding

Floods are defined as a temporary overflow of water onto lands that are not normally covered by water. Flooding results from the overflow of major rivers and tributaries, storm surges, and/ or inadequate local drainage. Floods can cause loss of life, property damage, crop/livestock damage, and water supply contamination. Floods can also disrupt travel routes on roads and bridges.

Inland floods are most likely to occur in the spring due to the increase in rainfall and melting of snow; however, floods can occur at any time of the year. A sudden thaw in the winter or a major downpour in the summer can cause flooding because there is suddenly a lot of water in one place with nowhere to go. Coastal flooding can be caused by storm surge associated with high wind events hurricanes or from tsunami.

100-year Floodplain Events

Floodplains are usually located in lowlands near rivers, and flood on a regular basis. The term 100 year flood does not mean that flood will occur once every 100 years. It is a statement of probability that scientists and engineers use to describe how one flood compares to others that are likely to occur. It is more accurate to use the phrase "1%

annual chance flood". What this means is that there is a 1% chance of a flood of that size happening in any year.

Rapid Snow Pack Melt

Warm temperatures and heavy rains cause rapid snowmelt. Quickly melting snow coupled with moderate to heavy rains are prime conditions for flooding.

River Ice Jams

Rising waters in early spring often breaks ice into chunks, which float downstream and often pile up, causing flooding. Small rivers and streams pose special flooding risks because they are easily blocked by jams. Ice collecting in river bends and against structures presents significant flooding threats to bridges, roads, and the surrounding lands.

Coastal Storm Surge

Storm Surge is most often associated with the landfall of a hurricane. Strong winds and low pressure combine to cause waves that can be 1 to 10 meters above normal[4]. Strong winds blowing toward shore cause the water to pile up at the shore, causing the storm surge. These affects are most intense on the right side of the hurricane eye where the winds are blowing on shore.

Tsunami

The National Tsunami Hazard mitigation Program (http://www.pmel.noaa.gov/tsunami-hazard/terms.html) defines a Tsunami as Japanese term derived from the characters "tsu" meaning harbor and "nami" meaning wave. Generally accepted by the international scientific community to describe a series of traveling waves in water produced by the displacement of the sea floor associated with submarine earthquakes, volcanic eruptions, or landslides.

Hurricane - High Wind Event

Significantly high winds occur especially during hurricanes, tornadoes, winter storms and thunderstorms. Falling objects and downed power lines are dangerous risks associated with high winds. In addition, property damage and downed trees are common during high wind occurrences.

Hurricanes

A hurricane is a tropical cyclone in which winds reach speeds of 74 miles per hour or more and blow in a large spiral around a relatively calm center (see Appendix C). The eye of the storm is usually 20-30 miles wide and may extend over 400 miles. High winds are a primary cause of hurricane-inflicted loss of life and property damage.

Tornadoes

A tornado is a violent windstorm characterized by a twisting, funnel shaped cloud. They develop when cool air overrides a layer of warm air, causing the warm air to rise rapidly. The atmospheric conditions required for the formation of a tornado include great thermal

[4] University of Illinois, World Weather 2010 Project http://ww2010.atmos.uiuc.edu/

instability, high humidity and the convergence of warm, moist air at low levels with cooler, drier air aloft. Most tornadoes remain suspended in the atmosphere, but if they touch down they become a force of destruction.

Tornadoes produce the most violent winds on earth, at speeds of 280 mph or more. In addition, tornadoes can travel at a forward speed of up to 70 mph. Damage paths can be in excess of one mile wide and 50 miles long. Violent winds and debris slamming into buildings cause the most structural damage.

The Fujita Scale is the standard scale for rating the severity of a tornado as measured by the damage it causes (see Appendix D). A tornado is usually accompanied by thunder, lightning, heavy rain, and a loud "freight train" noise. In comparison with a hurricane, a tornado covers a much smaller area but can be more violent and destructive.

Severe Thunderstorms

All thunderstorms contain lightning. During a lightning discharge, the sudden heating of the air causes it to expand rapidly. After the discharge, the air contracts quickly as it cools back to ambient temperatures. This rapid expansion and contraction of the air causes a shock wave that we hear as thunder, which can damage building walls and break glass.

Lightning

Lightning is a giant spark of electricity that occurs within the atmosphere or between the atmosphere and the ground. As lightning passes through air, it heats the air to a temperature of about 50,000 degrees Fahrenheit, considerably hotter than the surface of the sun. Lightning strikes can cause death, injury and property damage.

Hail

Hailstones are balls of ice that grow as they're held up by winds, known as updrafts, which blow upwards in thunderstorms. The updrafts carry droplets of supercooled water – water at a below freezing temperature – but not yet ice. The supercooled water droplets hit the balls of ice and freeze instantly, making the hailstones grow. The faster the updraft, the bigger the stones can grow. Most hailstones are smaller in diameter than a dime, but stones weighing more than a pound have been recorded. Details of how hailstones grow are complicated, but the results are irregular balls of ice that can be as large as baseballs, sometimes even bigger. While crops are the major victims, hail is also a hazard to vehicles and windows.

Severe Winter Weather

Ice and snow events typically occur during the winter months and can cause loss of life, property damage and tree damage.

Heavy Snow Storms

A winter storm can range from moderate snow to blizzard conditions. Blizzard conditions are considered blinding, wind-driven snow over 35 mph that lasts several days. A severe winter storm deposits four or more inches of snow during a 12-hour period or six inches of snow during a 24-hour period.

Ice Storms
An ice storm involves rain, which freezes upon impact. Ice coating at least one-fourth inch in thickness is heavy enough to damage trees, overhead wires and similar objects. Ice storms often produce widespread power outages.

Nor'easter
A large weather system traveling from South to North passing along or near the seacoast. As the storm approaches New England and its intensity becomes increasingly apparent, the resulting counterclockwise cyclonic winds impact the coast and inland areas form a Northeasterly direction. The sustained winds may meet or exceed hurricane force, with larger bursts, and may exceed hurricane events by many hours in terms of duration (definition from NH Hazard Mitigation Plan).

Wildfire

Forest Fires and Grass Fires
Wildfire is defined as an uncontrolled and rapidly spreading fire. A forest fire is an uncontrolled fire in a woody area. They often occur during drought and when woody debris on the forest floor is readily available to fuel the fire. Grass fires are uncontrolled fires in grassy areas.

Earthquakes

Geologic hazard events are often associated with California, but New England is considered a moderate risk earthquake zone. An earthquake is a rapid shaking of the earth caused by the breaking and shifting of rock beneath the earth's surface. Earthquakes can cause buildings and bridges to collapse, disrupt gas, electric and phone lines, and often cause landslides, flash floods, fires, and avalanches. Larger earthquakes usually begin with slight tremors but rapidly take the form of one or more violent shocks, and end in vibrations of gradually diminishing force called aftershocks. The underground point of origin of an earthquake is called its focus; the point on the surface directly above the focus is the epicenter. The magnitude and intensity of an earthquake is determined by the use of scales such as the Richter scale and Mercalli scale (see Appendix E).

Profile of Past and Potential Natural Hazards

As discussed above the natural hazards that were identified for mitigation in this *Plan* include: flooding, hurricanes-high wind events, severe winter weather, wildfire and conflagration, earthquakes and coastal storms. Some of the natural hazards could be included under more than one type of hazard. For example a hurricane could be considered a high wind event, a flooding event or a coastal storm; depending on the storm's consequences.

The hazard profiles below include: a description of the events included as part of the natural hazard, the geographic location of each natural hazard (if applicable), the extent of the natural hazard (e.g. magnitude or severity), probability, past occurrences, and community vulnerability. Past occurrences of natural hazards were mapped if possible (Map 2: Past and Future Hazards). Some of the natural hazards have not occurred within the Town of Seabrook (within written memory), for these hazards the *Plan* refers to a table of hazards that have occurred regionally and statewide (Table 4). Community vulnerability identifies the specific areas, general type of structures, specific structures, or general vulnerability of the Town of Seabrook to each natural hazard.

Flooding

Description: Flooding events can include hurricanes, 100-year floods, 500-year floods, debris-impacted infrastructure, erosion, mudslides, rapid snow pack melt, river ice jams, dam breach and/or failure, coastal storm surge, and tsunami.

Location: Seabrook is vulnerable to flooding in several locations. Generally, the Town is at risk within the Flood Zones identified by FEMA on Flood Insurance Rate Maps (FIRM). Seabrook has two major flood zones: A, AE and X-500. These flood zones correspond to the Special Flood Hazard Area (100-year flood zone: V, A and AE) and the 500-year flood zone. Seabrook has a small area of V-zone, susceptible to coastal flooding. There are also several locally-identified areas susceptible to flooding that are not within these flood zones, these areas are described below and displayed on Map 2: Past and Future Hazards.

Extent: The extent of the Special Flood Hazard Zone and the 500-year flood zone can be seen in Map 2: Past and Future Hazards. This map also includes areas of locally chronic flood problems.

Probability: **High**.

Table 1: Probability of Flooding based on return interval

Flood Return Interval	Chance of Occurrence in Any Given Year
10-year	10%
50-year	2%
100-year	1%
500-year	0.2%

Past Occurrence: Flooding is a common hazard for the Town of Seabrook. Several locations were identified as areas of chronic reoccurring flooding or high potential for future flooding. These areas are listed below. Larger flood events are listed in Table 3.

Community Vulnerability:

- Structures located in the flood zone
- Culverts
- Basements
- Erodable soils
- Locally-identified flood areas (Map 2: Past and Future Hazards)

Hurricanes -High Wind Events

Description: High wind events can include hurricanes, tornadoes, "Nor'-Easters," downbursts and lightning/thunderstorm events.

Location: Hurricane events are more potentially damaging with increasing proximity to the coast. For this *Plan*, high-wind events were considered to have an equal chance of affecting any part of the Town of Seabrook.

Extent: Seabrook is located within a Zone II hurricane-susceptible region (indicating a design wind speed of 160 mph)[5]. Between 1900 and 1996 2 hurricanes have made landfall in New Hampshire, a category 1 and a category 2. In Maine, 5 hurricanes have made landfall (all category 1). In Massachusetts, 6 hurricanes have made landfall (2 category 1, 2 category 2 and 2 category 3). From this information it can be extrapolated that Seabrook is a high risk to a hurricane event, with variable wind speeds between 74 – 130 mph (category 1-3).

From 1950 to 1995 Rockingham County was subject to 9 recorded tornado events, these included 2 type F0 (Gale Tornado, 40-72 mph), 2 type F1 (Moderate Tornado, 73-112 mph), 4 type F2 (Significant Tornado, 113-157 mph) and 1 type F3 (Severe Tornado, 158-206 mph)[6]. Type 3 tornados can cause severe damage including tearing the roofs and walls from well-constructed homes, trees can be uprooted, trains over-turned, and cars lifted off the ground and thrown[7].

Probability: **High**. The State of New Hampshire's Natural Hazards Mitigation Plan rates Rockingham County with high likelihood of hurricane, tornado and "Nor'-Easters" events. Also, it rates the risk of downbursts, lightning and hail events as moderate.

Past Occurrence:
Between 1635 and 1991, 10 hurricanes have impacted the State of New Hampshire. The worst of these occurred on September 21, 1938, with wind speeds of up to 186 mph in MA and 138mph elsewhere. Thirteen of 494 people killed by this storm were residents of New Hampshire. The Storm caused $12,337,643 in damages (1938 dollars), timber not included.

Rockingham County tornado history is as follows: Category F0 tornados occurred on Oct. 03, 1970 and June 09, 1978. Category F1 tornados occurred on July 31, 1954 and July 26, 1966. Category F2 tornados occurred on Aug. 21, 1951, June 19, 1957, July 02, 1961 and June 09, 1963. The category F3 tornado occurred on June 09, 1953.

Community Vulnerability:

- Power lines,
- Shingled roofs,
- Chimneys, and
- Trees

Severe Winter Weather

Description: There are three types of winter events**:** blizzards, ice storms and extreme cold. All of these events are a threat to the community with subzero temperatures from extreme wind chill and storms causing low visibility for commuters. Snow storms have been known to collapse buildings. Ice storms disrupt power and communication services. Extreme cold affects the elderly.

[5] "Understanding Your Risks, Identifying Hazards and Estimating Losses", FEMA, page
[6] The tornado project .com
[7] "Understanding Your Risks, Identifying Hazards and Estimating Losses", FEMA, page

Location: Severe winter weather events have and equal chance of affecting any part of the Town of Seabrook.

Extent: Large snow events in Southeastern New Hampshire can produce 30 inches of snow, or more. Portions of central New Hampshire recorded snowfalls of 98" during one slow moving storm in February of 1969. Ice storms occur with regularity in New England. Seven severe ice storms have been recorded that affected New Hampshire since 1929. These events caused disruption of transportation, loss of power and millions of dollars in damage.

Probability: **High**. The State of New Hampshire's Natural Hazards Mitigation Plan rates Rockingham County with high likelihood of heavy snows and ice storms.

Past Occurrence: A list of past winter storm events is displayed below, in Table 3.

Community Vulnerability:

- Power lines
- Trees
- Elderly Populations

Wildfires

Description: Wildfires include grass fires and forest fires. Seabrook is at risk to wildfires associated with Phragmites Australis: A very tall grass that proliferates in brackish water near the coast. This plant is a recognized fire danger. The National Fire Danger Rating System has designated this type of marsh grass as a fire hazard described as "Marsh situations where the fuel is coarse and reed-like. One-third of the areal portion of the plants is dead. Fast-spreading, intense fires can occur even over standing water." *(Bradshaw, et al. 1983. The National Fire-danger Rating System: technical documentation. Gen. Tech. Rep. INT-169)*[8]. Phragmites is a prolific species that spreads by its root system and can grow to be over 12 feet in height.

Location: Three wooded or grassed areas of Town were identified as at-risk to wildfires (see Map 2: Past and Future Hazards). These areas are in the southern half of Town and include the forest surrounding the Seabrook Urban Forestry Center and portions of Great Bog.

Extent: Wildfires associated with the Phragmites would only affect a limited amount of the Town of Seabrook, those areas juxtaposed to the salt marsh and the coastal beaches. Fires in Phragmites are well known for being particularly hot and fast moving.

Probability: **Moderate**. Twenty years ago Phragmites was located in a few isolated pockets; today it covers hundred of acres in New Hampshire's salt marshes. Although, this type of fire has not occurred often in the past, it is becoming more prevalent as Phragmites spreads. The State of New Hampshire's Natural Hazards Mitigation Plan rates Rockingham County with high likelihood of wildfire. Due to Seabrook's lack of large tracks of forests, the Town's risk was downgraded to moderate.

[8] State of New Hampshire Hazard Mitigation Plan, 2000

Past Occurrence: A Seabrook fire in 1996 was started as a controlled burn. However, due to the density of the Phragmites, the fire burned so hot, it melted the vinyl siding off a nearby house. That fire was the impetus for a current Phragmites elimination project at that site funded by the NH Coastal Program. A fire in Salisbury, MA on April 8, 1999 is indicative of the danger that Phragmites poses. This fire began in the Phragmites and within 20 minutes had consumed 7 acres of the marsh. The fire then jumped a road, burned down a vacant home and threatened three other occupied dwellings. Fire fighters responding from 4 communities saved these dwellings. Seabrook was one of the fire departments to respond and the firefighters spent 6 hours bringing the blaze completely under control. Although the three houses were saved, one of them lost the vinyl siding on one side of the house and at least one outbuilding was lost.

Community Vulnerability:

- Structures located near large open vegetated areas prone to lightning strike
- Vulnerability increases during drought events

Earthquakes

Description: Seismic activity including landslides and other geologic hazards.

Location: An earthquake has an equal chance of affecting all areas in the Town of Seabrook.

Extent: New England is particularly vulnerable to the injury of its inhabitants and structural damage because of our built environment. Few New England States currently include seismic design in their building codes. Massachusetts introduced earthquake design requirements into their building code in 1975 and Connecticut very recently did so. However, these specifications are for new buildings, or very significantly modified existing buildings only. Existing buildings, bridges, water supply lines, electrical power lines and facilities, etc. have rarely been designed for earthquake forces (New Hampshire has no such code specifications).

Probability: **Moderate**. The State of New Hampshire's Natural Hazard Mitigation Plan ranks all of the Counties in the State with at moderate risk to earthquakes. The Town of Seabrook's Peak Ground Acceleration (PGA) values range between 6.1 and 21.0[9]. These numbers are associated with how much an earthquake is felt and how much damage it may cause (Table 2).

Table 2: Peak Ground acceleration (PGA) values for Seabrook (information from State and Local Mitigation Planning, FEMA).

PGA	Chance of being exceeded in the next 50 years	Perceived Shaking	Potential Damage
6.1	10%	Moderate	Very Light

[9] http://geohazards.cr.usgs.gov/eq/pubmaps/us.pga.050.map.gif

10.6	5%	Strong	Light
21.0	2%	Very Strong	Moderate

Past Occurrence: Large earthquakes have not affected the Town of Seabrook within recent memory. A list of earthquakes that have affected the region is displayed in Table 3.

Community Vulnerability:

- Dams,
- Bridges,
- Brick Structures,
- Infrastructure,
- Water and Gas lines, and
- Secondary hazards such as fire, power outages, or hazardous material leak or spill.

Coastal Storms

Description: The State's Atlantic seacoast and estuaries are vulnerable to extremes of storm water runoff and storm surge from coastal storms and hurricanes. A storm surge, especially when coupled with astronomical high tides, presents a threat to all land areas adjacent to the marine environment.

Location: The potential size of a storm surge is variable and sources also differ on the potential maximum size of a storm surge in the area of Seabrook, NH. NOAA's website states a Storm Surge could affect an area up to 15 feet above the normal tide level[10]. A University of Illinois website states that a storm surge could be as high as 25 feet[11]. These events are extreme, and very unlikely. A storm surge event in the Town of Seacoast would likely affect the Special Flood Hazard Area: V-zone. Because of this a separate damage assessment was not done for storm surge in chapter 5: Determining how much will be affected.

Extent: Coastal storms could affect much of Seabrook, due to the Town's low elevation. Assuming that the Town is vulnerable to category 3 hurricanes, the potential storm surge related to such a wind event could reach several feet above normal sea level[12]. A storm surge would affect many of the homes and businesses located near and adjacent to the waterline.

Probability: **High**. The State of New Hampshire's Natural Hazards Mitigation Plan rates Rockingham County with high likelihood of storm surge and hurricane events. The probability of this maximum storm surge event (approximately 25 feet high) is **Very Low**. Figure 3 below show the chance of a "named storm" affecting the areas as a percentage per year. From this map it can be interpolated that New Hampshire has between 18% and 24% of being affected by a named storm each year.

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[10] http://hurricanes.noaa.gov/prepare/surge.htm
[11] http://ww2010.atmos.uiuc.edu/(Gh)/guides/mtr/hurr/damg/surg.rxml
[12] "Understanding Your Risks, Identifying Hazards and Estimating Losses", FEMA, page

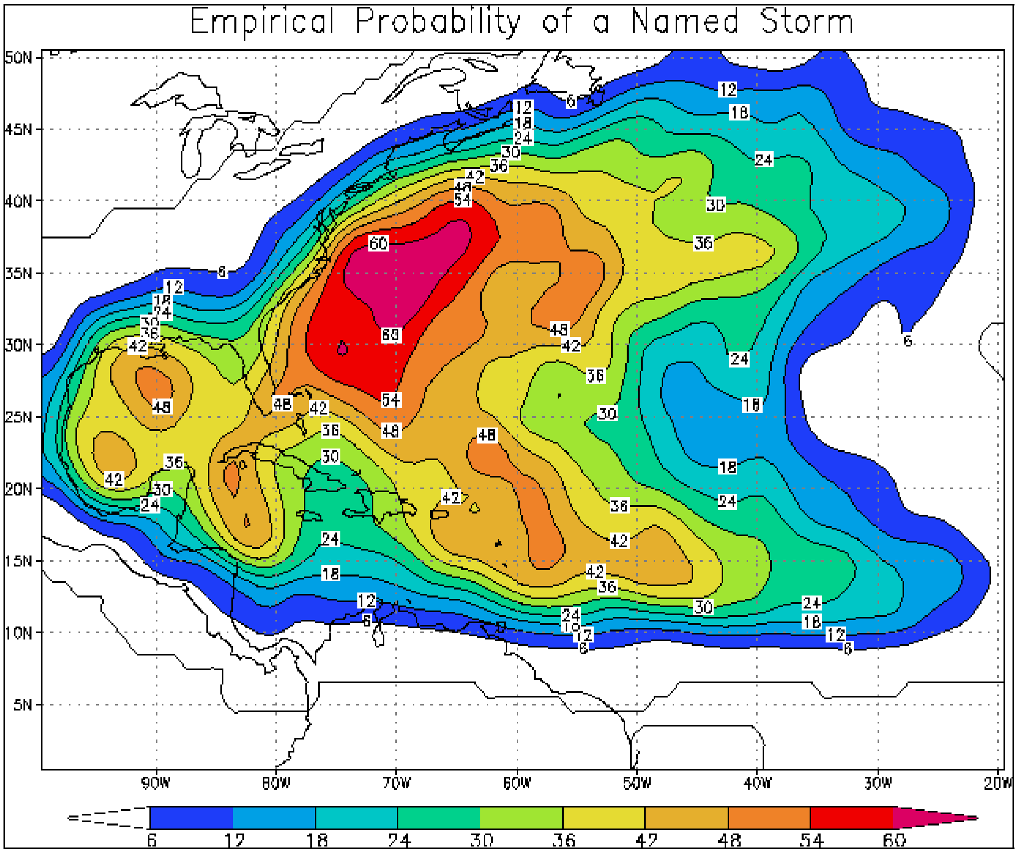

Figure 6: Coastal Storm Probability, per year. Source NOAA : www.aoml.noaa.gov/hrd/tcfaq/tcfaqG.htm1#G12

Past Occurrence: A list of hurricanes and Nor'easters that have affected the region are displayed below in Table 3.

Community Vulnerability:

- Structures near the shoreline
- Boats and docks
- Shoreline erosion
- Utilities near the shoreline

Table 3: Past Hazard Events in Seabrook and Rockingham County

Hazard	Date	Location	Critical Facility or Area Impacted	Remarks/Description

Hazard	Date	Location	Critical Facility or Area Impacted	Remarks/Description
Flood	March 11-21, 1936	Statewide	$133,000,000 in damage throughout New England, 77,000 homeless.	Double Flood; snowmelt/heavy rain.
Flood	September 21, 1938	Statewide	Unknown	Hurricane; stream stage similar to March 1936
Flood	July 1986 – August 10, 1986	Statewide	Unknown	**FEMA DR-771-NH**: Severe storms; heavy rain, tornadoes , flash flood, severe wind
Flood	August 7-11 1990	Statewide	Road Network	**FEMA DR-876-NH**: A series of storms with moderate to heavy rains; widespread flooding.
Flood	August 19, 1991	Statewide, Primarily Rockingham and Strafford Counties	Road Network	**FEMA DR-917-NH:** Hurricane Bob; effects felt statewide; counties to east hardest hit.
Flood	October 28, 1996	Rockingham County	Unknown - Typically structures and infrastructure in the floodplain	North and west regions; severe storms.
Flood	June – July 1998	Rockingham County	Heavy damage to secondary roads occurred	**FEMA DR-1231-NH:** A series of rainfall events
Hurricane	October 18,19 1778	Portions of State	Unknown	40-75 mph winds
Hurricane	1804	Portions of State	Unknown	
Hurricane	September 8, 1869	Portions of State	Unknown	> 50 mph winds
Great Hurricane Of 1938	September 21, 1938	All of Southern New England	2 billion board feet of timber destroyed; electric and telephone disrupted, structures damaged, flooding; statewide 1,363 families received assistance.	Max. wind speed of 186 mph in MA and 138mph max. elsewhere 13 of 494 dead in NH; $12,337,643 total storm losses (1938 dollars), timber not included.
Hurricane Carol	August 31, 1954	Southern New England	Extensive tree and crop damage in state.	SAFFIR/SIMPSON HURRICANE SCALE[13] - Category 3, winds 111-130 mph
Hurricane Donna	September 12, 1960	Southern and Central NH	Unknown	Category 3 Heavy Flooding
Hurricane Belle	August 10, 1976	Southern New England	Unknown	Category 1, winds 74-95 mph Rain and flooding in NH
Hurricane Gloria	September 27,	Southern New	Unknown	Category 2, winds 96-110

[13] For a complete description of the Saffir/Simpson Hurricane Scale see Appendix C.

Hazard	Date	Location	Critical Facility or Area Impacted	Remarks/Description
	1985	England		mph >70 mph winds; minor wind damage and
Tropical Storm Floyd	September 16-18 1999	Statewide	Unknown	
Ice Jam	Feb 29, 2000	Brentwood, NH Exeter River	Unknown	Discharge 570 cfs
Ice Jam	Mar 29, 1993	Epping, NH Lamprey River	Road flooding	
Tornado	May 21, 1814	Rockingham County	Unknown	F2[14]
Tornado	May 16, 1890	Rockingham County	Unknown	F2
Tornado	August 21, 1951	Rockingham County	Unknown	F2
Tornado	June 9, 1953	Rockingham County	Unknown	F3
Tornado	June 19, 1957	Rockingham County	Unknown	F2
Tornado	July 2, 1961	Rockingham County	Unknown	F2
Tornado	June 9, 1963	Rockingham County	Unknown	F2
Downburst	July 6, 1999	Stratham, NH	Five fatalities and eleven injuries. Major tree damage, power outages	Microburst $2,498,974 in damages
Ice Storm	December 17-20 1929	NH	Telephone, telegraph and power disrupted.	
Ice Storm	December 29-30 1942	NH	Unknown- Typically damage to overhead wires and trees.	Glaze storm; severe intensity
Ice Storm	December 22 1969	Parts of NH	Power disruption	Many communities affected
Ice Storm	January 17, 1970	Parts of NH	Power disruption	Many communities affected
Ice Storm	January 8-25 1979	NH	Major disruption of Power and transportation	
Ice Storm	March 3-6 1991	Southern NH	Numerous power outages in southern NH	Numerous in Southern NH
Ice Storm	January 7,	Rockingham	Power and phone	$17,000,000 in damages to

[14] For a complete description of the Fujita Tornado Damage Scale see Appendix D

Hazard	Date	Location	Critical Facility or Area Impacted	Remarks/Description
	1998	County	disrupted, communication tower collapsed.	PSNH equipment.
Snowstorm	February 4-7 1920	New England	Disrupt transportation for weeks	Boston 37-50cm of sleet , ice and snow
Snowstorm	February 15, 1940	New England	Paralyzed New England	30cm of snow with high wind.
Snowstorm	February 14-17 1958	Southern NH	Unknown	20-33" of snow
Snowstorm	March 18-21 1958	South central NH	Unknown	22-24"of snow
Snowstorm	March 2-5 1950	Southern NH	Unknown	25"of snow
Snowstorm	January 18-20 1961	Southern NH	Unknown	Blizzard Conditions; 50cm of snow
Snowstorm	February 8-10 1969	Southeastern NH	Paralyzing snow	27"of snow and high winds
Snowstorm	February 22-28 1969	Central NH	Unknown	34-98"of snow; very slow moving
Snowstorm "Blizzard of'78"	February 5-7 1978	Statewide	Trapped commuters on highways, businesses closed	Hurricane force winds; 25-33"of snow. People disregard warnings due to a series of missed forecasts
Snowstorm	April 5-7 1982	Southern NH	Unknown	Late season with thunderstorms and 18-22" of snow
Earthquake	November 18, 1929	Grand Banks Newfoundland	No damage	Richter Magnitude Scale: 7.2[15]
Earthquake	December 20, 1940	Ossipee	Ground Cracks and damage over a broad area	Richter Magnitude Scale: 5.5; Felt over 341 miles away.
Earthquake	December 24, 1940	Ossipee	Ground Cracks and damage over a broad area	Richter Magnitude Scale: 5.5; Felt over 550 KM away.
Earthquake	June 15, 1973	Quebec/NH border	Minor damage	Richter Magnitude Scale: 4.8
Earthquake	June 19, 1982	West of Laconia	Little damage	Richter Magnitude Scale: 4.5
Drought	1929-36	Statewide	Unknown	Regional
Drought	1939-44	Statewide	Unknown	Severe in southeast NH
Drought	1947-50	Statewide	Unknown	Moderate
Drought	1960-69	Statewide	Unknown	Longest recorded continuous period of below normal precipitation
Drought Warning	June 6, 1999	Most of State	Unknown	Governors office declaration; Palmer Drought Survey Index indicate "moderate drought" for most of state.

[15] For a complete description of the Richter Magnitude Scale see Appendix E.

Sources: New Hampshire Bureau of Emergency Management, 2000; Town of Seabrook;
Northeast States Emergency Consortium (NESEC) Website: http://www.nesec.org;
US Army Corp of Engineers Ice Jam Database, http://www.crrel.usace.army.mil/cgi-bin/ice/ijdb;
Tornado Project, http://www.tornadoproject.com

CHAPTER IV. CRITICAL FACILITIES

The Critical Facilities List for the Town of Seabrook has been identified by RPC Staff and members of the Town. The Critical Facilities List has been broken up into four categories. The *first category* contains facilities needed for Emergency Response in the event of a disaster. The *second category* contains Non-Emergency Response Facilities. These are not required in an emergency response event, but are considered essential for the everyday operation of Seabrook. The *third category* contains Facilities/Populations to protect in the event of a disaster. The *fourth category* contains Potential Resources, which can provide services or supplies in the event of a disaster. A description of critical facilities can be found in Table 4 through Table 7 and locations can be found on Map 3: Critical Facilities.

Table 4: Category 1 - Emergency Response Services and Facilities:

Critical Facility	Facility Type	Comments
Seabrook Town Office	Town Office	
Seabrook Station	Nuclear Power Plant	
Seabrook Police Station	Police Station	Back-up Power
Seabrook Fire Department	Fire station	Also EOC
Emergency Fuel Storage Area	Emergency Fuel	
Seabrook Public Works Garage	Public Works Garage	Back-up Power
Route 107 Bridge	Bridge	Evacuation Route
Route 1A Draw-Bridge	Bridge	Evacuation Route
Back Water Road Bridge	Bridge	Evacuation Route
NH 286 over BMRR	Bridge	
BMRR over Walton Rd.	Bridge	
Causeway Rd. Over Mill Creek	Bridge	
Centennial Rd. over Mill Creek	Bridge	

Table 5: Category 2 - Non Emergency Response Facilities:
The Town has identified these facilities as non-emergency facilities; however, they are considered essential for the everyday operation of Seabrook.

Critical Facility	Facility Type	Comments
Sewage Pump Station #1	Sewage Pump Station	
Sewage Pump Station #2	Sewage Pump Station	
Sewage Pump Station #3	Sewage Pump Station	
Sewage Pump Station #4	Sewage Pump Station	
Sewage Pump Station #5	Sewage Pump Station	
Wastewater Treatment Plant	Sewage Treatment Plant	
Water tank/tower #1	Water Storage	
Water tank/tower #2	Water Storage	
Seabrook Transfer Station	Waste Transfer Station	
Canes Brook Dam	Dam	Hazard Class A (Low Hazard)
Canes Brook at Lakeshore Dr. Dam	Dam	Hazard Class A (Low Hazard)
Second Pond Dam	Dam	Hazard Class A (Low Hazard)
Canes Mill Pond Dam	Dam	Hazard Class A (Low Hazard)

Table 6: Category 3 - Facilities/Populations to Protect:
The third category contains people and facilities that need to be protected in event of a disaster.

Critical Facility	Facility Type	Comments
Dynamic Chrome Industries	Hazardous Materials Storage	
ERA Industries	Hazardous Materials Storage	
J & C Industries	Hazardous Materials Storage	
Loc Tite	Hazardous Materials Storage	
Waterline Industries	Hazardous Materials Storage	
Town Cemetery/ Tomb	Cemetery / Tomb	
703	Elderly Apartments	
Seabrook Library	Library	
Seabrook Church of Christ	Church	
Four Corners	Church	
Rand Memorial	Church	
St. Elizabeth's	Church	
Trinity United	Church	
Seabrook Elementary School	School	Shelter
Seabrook Community Center	Community Center	Shelter
Grey Hound Race Track	Recreation	

Table 7: Category 4 - Potential Resources:
This category contains facilities that provide potential resources for services or supplies in the event of a natural disaster.

Critical Facility	Facility Type	Comments
Seabrook Elementary School	Shelter	Also listed in Category 3
Seabrook Community Center	Shelter	Also listed in Category 3
Poland Springs NE Distribution Center	Bottled Water Warehouse	New England Distribution Hub

CHAPTER V. DETERMINING HOW MUCH WILL BE AFFECTED

Identifying Vulnerable Facilities

It is important to determine what the most vulnerable areas of the Town of Seabrook are and to estimate their potential loss. The first step is to identify the areas most likely to be damaged in a hazard event. To do this, the locations of buildings and other structures were compared to the location of potential hazard areas identified using GIS (Geographic Information Systems). Vulnerable buildings were identified by comparing their location to possible hazard events. For example, all of the structures within the 100-year and 500-year floodplains were identified and used in conducting the potential loss analysis for flooding.

Calculating the Potential Loss

The next step in completing the loss estimation involved assessing the level of damage from a hazard event as a percentage of the buildings' assessed value. The assessed value for every parcel in Seabrook was provided for the purpose of calculating damage estimates. The damage estimates are divided into two categories based on hazard types: hazards that are location specific (e.g. flooding), and hazards that could affect all areas of Seabrook equally. Damage estimates from hazards that could affect all of Seabrook equally are much rougher estimates, based on percentages of the total assessed value of Seabrook. Damage estimates from hazard with a specific location are derived from the assessed values of the parcels with the hazard area. Seabrook's Parcels database was used in conjunction with building footprints, elevation data, and 2003 digital aerial images of the city; to determine which buildings were potentially in danger from each of the location specific hazard areas. The GIS was used to determine which parcels were affected by which potential hazard areas.

After identifying the parcels and buildings that are at risk, the next step was to calculate a damage estimate for each potential hazard area. FEMA provides a model for estimating damage for various flooding events, so the flood damage estimates provide information including: damage estimates for structures, contents of buildings, functional downtime and replacement time. For wildfire and urban conflagration, damage estimates were determined for the buildings in the potential hazard areas as well as estimates of the building content value, based on the same estimates from the flood model. For the Storm surge damage estimate only the assessed values of the structures. This was because the storm surge hazard area is a potentially high estimate of storm surge inundation. The following discussion summarizes the potential loss estimates due to natural hazard events.

Flooding – Special Flood Hazard Zones

The average replacement value was calculated by totaling the assessed values of all structures in the 100-year (V, A and AE SPHZ) and 500-year floodplains (X500 SFHZ). These structures were identified by overlaying digital versions of FEMA's FIRM maps and locally identified flood hazard areas on digital aerial photography of the Town of Seabrook. Because of the scale and resolution of the FIRM maps this is only an approximation of the total structures at risk to these various flood hazards. If a structure is outside of the SFHZ identified in this exercise it does not mean that it is not at potential risk to flood damage. The damage estimates were calculated using FEMA's method for modeling flood damage to structures and their contents according to the depth of the flood[16].

[16] "Understanding Your Risks, Identifying Hazards and Estimating Losses", FEMA, page 4-13.

The potential loss was calculated by multiplying the assessed value of the structure by the percent of damage expected from a hazard event (e.g. 4-foot flood =28% structural damage). In addition, an estimate of the replacement value of the contents of each structure was determined according to FEMA guidelines[17]. The FEMA model predicts mobile homes will receive a higher percentage of damage during a flood event. When calculating the damage assessments the zoning of each parcel was identified to determine if mobile homes were present in the flood area. If mobile homes were present they were identified on the digital imagery to determine how many individual mobile homes would be affected by a particular flood (A-Zone, AE-Zone, etc.). The total damage estimates were calculated by totaling the structural damage and contents damage for each flood area and then combining those estimates into a total damage estimate for each flood type. The costs for repairing or replacing bridges, railroads, power lines and telephone lines are not included in these estimates. In addition, the figures used were based on buildings which are one or two stories high with basements, buildings without basements could expect to receive less damage. The following calculations are based on three possible flood events: a one-foot flood, a two-foot flood, and a four-foot flood.

The percentage of structural damage and contents damage that could be expected for each flood depth is shown in Table 8, along with estimates of functional downtime (how long a business/residence would be down before relocating) and displacement time (how long a business/residence would be displaced from its flooded location). The damage in dollars for each flood depth is shown in Table 9.

Table 8: Percentages of structural and content damage, based on the assessed value of a flooded parcel. Also shows the functional downtime and displacement time for each flood event.

Flood Depth	One-foot	Two-foot	Four-foot
% Structural Damage: Buildings	15%	20%	28%
% Structural Damage: Mobile Homes	44%	63%	78%
% Contents Damage: Buildings	22.5%	30%	42%
% Contents Damage: Mobile Homes	30%	90%	90%
Flood Functional Downtime: Buildings	15 days	20 days	28 days
Flood Functional Downtime: Mobile Homes	30 days	30 days	30 days
Flood Displacement Time: Buildings	70 days	110 days	174 days
Flood Displacement Time: Mobile Homes	302 days	365 days	365 days

Table 9: Damage estimates for Buildings and Mobile Homes for each flood zone, by flood depth.

Flood Zone	Buildings	Mobile	Buildings	Mobile	Buildings	Mobile

[17] "Understanding Your Risks, Identifying Hazards and Estimating Losses", FEMA, page 4-13.

	1-foot Flood	1-foot Flood	2-foot Flood	2-foot Flood	4-foot Flood	4-foot Flood
A	701,203	525,902	940,211	702,420	1,303,882	961,482
AE	7,232,143	5,424,107	9,668,510	7,238,063	13,475,530	10,026,728
V	198,525	148,894	264,700	198,525	370,580	277,935
X-500	2,664,777	1,998,582	3,557,438	2,665,793	4,970,050	3,713,822

Flooding – Locally Identified Flood Hazard Areas

Several areas of Seabrook were identified as having high risk of flooding. These areas are identified in Chapter III and Map 2: Past and Future Hazards. Potential losses, shown in Table 10, were also calculated for these at-risk areas in the same manner as those structures in the 100 and 500 year floodplains. Again, these assessments are only based on the potential damages to buildings and mobile homes, and there contents, within the identified at-risk areas.

Table 10: Damage estimates for Buildings and Mobile Homes for each local flood hazard area, by flood depth.

Local Flood Area	Buildings 1-foot Flood	Mobile 1-foot Flood	Buildings 2-foot Flood	Mobile 2-foot Flood	Buildings 4-foot Flood	Mobile 2-foot Flood
1	454,801	341,100	610,851	455,828	844,716	619,673
2	117,622	88,217	161,999	118,815	214,630	144,867
3	280,354	210,266	378,533	281,445	518,818	374,385
4	77,844	58,383	105,053	78,135	144,106	104,151
5	59,370	44,528	79,160	59,370	110,824	83,118
6	87,344	65,508	117,243	87,525	162,294	119,277
7	65,460	49,095	87,280	65,460	122,192	91,644
8	96,165	72,124	128,220	96,165	179,508	134,631

Hurricane/ High Wind Events

~Hurricane

Hurricanes do affect the Northeast coast periodically. Since 1900, 2 hurricanes have made landfall in the State of New Hampshire. Due to the location of the Town of Seabrook most hurricanes would likely degrade to tropical storms by the time they impact the City. As shown in the figure in Appendix C, hurricanes that strike New England tend to come from the south, and therefore have a change to downgrade as they pass over land on there way to New Hampshire. Even degraded hurricanes or tropical storms could still cause significant damage to the structures and infrastructure of the Town of Seabrook. The assessed value of all the residential and commercial structures in the Town of Seabrook, including exempt structures such as schools and churches, is $1,438,175,000 (not including Seabrook Station). Assuming 1% to 5% damage, a hurricane could result in $14,381,750 to $71,908,750 of structure damage.

~Tornado

Tornadoes are relatively uncommon natural hazards in New Hampshire. On average, about six touch down each year. Damage largely depends on where the tornado strikes. If is strikes an inhabited area, the impact could be severe. In the State of New Hampshire, the total cost of tornadoes between 1950 and 1995 was $9,071,389 (The Disaster Center). The assessed value of all the residential and commercial structures in the Town of Seabrook, including exempt structures such as schools and churches, is $1,438,175,000 (not including Seabrook Station). Assuming 1% to 5% damage, a hurricane could result in $14,381,750 to $71,908,750 of structure damage.

~Severe Lightning
The amount of damage caused by lightning will vary according to the type of structure hit and the type of contents inside. There is now record of monetary damages inflicted in the Town of Seabrook from lightning strikes.

Coastal Storms
~Storm Surge
A storm surge event would likely mimic the damage estimate for the SFHA: V-Zone. As seen above.

Severe Winter Weather
~Heavy Snowstorms
Heavy snowstorms typically occur during January and February. New England usually experiences at least one or two heavy snow storms with varying degrees of severity each year. Power outages, extreme cold and impacts to infrastructure are all effects of winter storms that have been felt in Seabrook in the past. All of these impacts are a risk to the community, including isolation, especially of the elderly, and increased traffic accidents. Damage caused as a result of this type of hazard varies according to wind velocity, snow accumulation and duration. The assessed value of all the residential and commercial structures in the Town of Seabrook, including exempt structures such as schools and churches, is $1,438,175,000 (not including Seabrook Station). Assuming 1% to 5% damage, a hurricane could result in $14,381,750 to $71,908,750 of structure damage.

~Ice Storms
Ice storms often cause widespread power outages by downing power lines, making power lines at risk in Seabrook. They can also cause severe damage to trees. In 1998, an ice storm inflicted $12,466,202 worth of damage to New Hampshire as a whole. Ice storms in Seabrook could be expected to cause damage ranging from a few thousand dollars to several million, depending on the severity of the storm.

Wildfire
The risk of fire is difficult to predict based on location. Forest fires and grass fires are more likely to occur during years of drought. The areas are identified as at risk to wildfire on Map 2: Past and Future Hazards. These areas include large tracts of open vegetation including forests and grasslands. Drought conditions increase the risks of wildfire in these open vegetated areas.

~Forest fire Damage
The total value of all the residential and commercial structures in this section of Seabrook, including exempt structures such as schools and churches, is $91,563,400. Assuming 1% to 5% damage, a wildfire could result in $915,634 to $4,575,170 of structure damage.

~Grass Fire Damage
The total value of all the residential and commercial structures in this section of Seabrook, including exempt structures such as schools and churches, is $2,352,800. Assuming 1% to 5% damage, a wildfire could result in $23,528 to $117,640 of structure damage

Earthquakes
Earthquakes can cause buildings and bridges to collapse, disrupt gas, electric and phone lines and are often associated with landslides and flash floods. Four earthquakes in New Hampshire,

between the years 1924-1989, had a magnitude of 4.2 or more. Two of these occurred in Ossipee, one west of Laconia, and one near the Quebec border. If an earthquake were to impact the Town of Seabrook buildings that are not built to a high seismic design level would be susceptible to structural damage. The assessed value of all the residential and commercial structures in Seabrook, including exempt structures such as schools and churches, is $1,438,175,000 (not including Seabrook Station). Assuming 1% to 5% damage, a hurricane could result in $14,381,750 to $71,908,750 of structure damage.

FEMA has a model to predict damage to buildings based on their construction materials and seismic design level. It is not in the scope of this *Plan* to estimate the damages for each assessed structure for the Town of Seabrook. What is possible for this *Plan* is to display the potential damage to several types of structures of varying construction materials, as a percentage of there total value. Table 11 provides two damage estimates for each building type, one from a small earthquake and one from a larger earthquake (PGA of 0.07 and 0.20 respectively). The damage estimates are shown as Building Damage (bold) and as a Loss of Function in days. Building Damage is an estimate of structural damage as a percentage of the building value. Contents of the buildings can also be assumed to be damaged to a value of half that of the structure[18]. For example, a building predicted to receive $100,000 in structural damage could expect $50,000 in additional damage to the contents of that building.

[18] "Understanding Your Risks, Identifying Hazards and Estimating Losses", FEMA, pages 4-16 through 4-24.

Table 11: Earthquake Damage and Loss of Function Table. Building Damage and Functional Loss are based on the type of Structure and the PGA (g). Two PGA (Peak Ground Acceleration) were chosen for this Table, 0.07 and 0.20 which represent a low and high example of potential earthquake in Seabrook, NH.

		Wood Frame Construction				**Reinforced Masonry**				**Unreinforced Masonry**	
PGA (g)		High	Mod.	Low	Precode	High	Mod.	Low	Precode	Low	Precode
0.07	**Single Family**	**0.1**	**0.2**	**0.3**	**0.4**	**0.1**	**0.2**	**0.4**	**0.5**	**0.6**	**1.0**
0.20		**1.3**	**1.7**	**2.8**	**3.3**	**1.3**	**2.5**	**6.1**	**9.0**	**6.5**	**9.4**
0.07		0	0	1	1	0	1	2	7	6	12
0.20		2	3	9	15	4	16	58	106	64	114
0.07	**Apartment**	**0.1**	**0.2**	**0.3**	**0.3**	**0.1**	**0.2**	**0.4**	**0.5**	**0.6**	**0.8**
0.20		**1.5**	**1.9**	**3.0**	**3.2**	**1.5**	**2.6**	**5.4**	**6.9**	**5.5**	**7.5**
0.07		0	0	1	1	0	1	2	8	7	13
0.20		2	3	10	16	4	19	72	129	76	147
		Steel Frame (Braced)				**Reinforced Masonry**				**Unreinforced Masonry**	
		High	Mod.	Low	Precode	High	Mod.	Low	Precode	Low	Precode
0.7	**Retail Trade**	**0.2**	**0.3**	**0.4**	**0.5**	**0.1**	**0.2**	**0.4**	**0.6**	**0.7**	**1.0**
0.20		**2.4**	**2.8**	**3.8**	**5.6**	**1.5**	**2.7**	**5.9**	**8.3**	**6.1**	**8.7**
0.07		0	0	0	0	0	0	0	1	1	2
0.20		2	3	6	12	1	3	12	22	14	24
		Pre-Cast Concrete Tilt-up				**Light Metal Building**					
		High	Mod.	Low	Precode	High	Mod.	Low	Precode		
0.07	**Wholesale Trade**	**0.2**	**0.4**	**0.5**	**0.6**	**0.4**	**0.7**	**1.0**	**1.6**		
0.20		**2.6**	**4.1**	**8.3**	**10.8**	**3.8**	**5.4**	**10.3**	**14.8**		
0.07		0	1	1	2	1	2	3	6		
0.20		4	8	22	36	6	13	28	43		
0.07	**Office Building**	**0.2**	**0.3**	**0.4**	**0.6**	**0.2**	**0.3**	**0.4**	**0.5**		
0.20		**2.0**	**2.9**	**5.6**	**8.1**	**2.5**	**2.9**	**3.7**	**5.2**		
0.07		0	0	0	1	0	0	0	1		
0.20		1	3	11	21	2	3	5	11		
		Pre-cast Concrete Tilt-up									
		High	Mod.	Low	Precode						
0.07	**Light Industrial**	**0.1**	**0.4**	**0.4**	**0.5**						
0.20		**2.6**	**3.9**	**6.0**	**7.4**						
0.07		0	1	1	2						
0.20		4	7	21	34						

2.0	Building Damage = % of damage based on value
2	Loss of Function (# of Days)
	No Information

High, Moderate, Low and Precode refer to general seismic design level

CHAPTER VI. EXISTING HAZARD MITIGATION PROGRAMS

This section identifies those programs that are currently in place as hazard mitigation actions or strategies for the Town of Seabrook, NH. The table below (Table 12), displays existing ordinance, regulations, plans and Town departments that plan for, or react to, natural hazards to mitigate possible damage.

Table 12: Existing Hazard Mitigation Programs for the Town of Seabrook.

Existing Protection	Description/ Area Covered	Responsible Local Agent	Effectiveness/Comments
Zoning Ordinance	Town Wide	Zoning Officer	Good, May need updates
Town Building Code	NH State Building Code	Building Inspector	Good
Flood Warning System	Town Wide, Siren	Fire/Police Departments	Good, addition of Reverse 911 would improve system
Hazardous Materials Plan/ Team	Seacoast "START" Plan	Fire Chief	Good
Emergency Operations Plan	All Hazards	Fire/Police Departments	Good, Needs Updates
Seabrook Radiological Plan	Town Wide	Emergency Management Director	Good
Emergency Services: Police Department	Town Wide	Police Chief	Good
Emergency Services: Fire Department	Town Wide	Fire Chief	Good
Emergency Services: EMS	Town Wide	Fire Chief	Good, Increased Drilling would improve response
Public Works	Town Wide	Department of Public Works	Good
Town Master Plan	Town Wide, 2003	Planning Board	Good, Needs Additions
Emergency Back-up Power	Fire Chief	Average	Shelters Need Generators

CHAPTER VII. NEWLY IDENTIFIED MITIGATION STRATEGIES/ ACTIONS

• Potential Mitigation Strategies

The Action Plan was developed by analyzing the existing Town programs, the proposed improvements and changes to these programs. Additional programs were also identified as potential mitigation strategies. These potential mitigation strategies were ranked in five categories according to how they accomplished each item:

- Prevention
- Property Protection
- Structural Protection
- Emergency Services
- Public Information and Involvement

A list of strategies and actions that could be taken to mitigation future hazards is compiled in Table 13.

Table 13: List of hazard mitigation strategies or actions developed for Seabrook, New Hampshire.

Mitigation Strategies or Action	Hazard(s) Mitigated
Review Existing Infrastructure: Evaluate existing infrastructure (Roads, Bridges, Storm water Management Devices, Etc.) for repair replacement needs. Emphasis on infrastructure critical during hazard situation (e.g. evacuation route, culverts)	All Hazards
Repair/ Replace Infrastructure: Implement schedule for repair or replacement of infrastructure in need. Incorporate into CIP or as warrant articles.	All Hazards, Flooding
Require Vegetation Setbacks: Assess Town resident's opinion on requiring vegetation setbacks to reduce wildfire risk. Draft Zoning Ordinance for Town Meeting.	Wildfire
Increase Emergency Shelters: Assess current evacuation/emergency shelter capacity. Establish additional shelters as needed.	All Hazards
Update/Install Generators in Shelters: Provide back-up power generators for all evacuation/emergency shelters.	All Hazards
Electronic Signage: Purchase electronic signage to direct traffic and provide public information during hazard events.	All Hazards
Update Emergency Operations Plan: Update the EOP to update emergency management personnel's roles.	All Hazards
Reverse 911: Install Reverse 911 system to provide emergency contact will all Town residents.	All Hazards
Update CIP: Update CIP to address Seabrook Department Hazard equipment needs.	All Hazards
Evaluate Existing Hazard Training and Drills: Review existing training and drilling schedule. Establish drill schedule that includes all involved Seabrook departments.	All Hazards

CHAPTER VIII. FEASIBILITY AND PRIORITIZATION OF PROPOSED MITIGATION STRATEGIES

The goal of each strategy or action is reduction or prevention of damage from a hazard event. In order to determine their effectiveness in accomplishing this goal, a set of criteria was applied to each proposed strategy. A set of questions that included the STAPLEE method was developed to rank the proposed mitigation actions. The STAPLEE method analyzes the Social, Technical, Administrative, Political, Legal, Economic and Environmental aspects of a project and is commonly used by public administration officials and planners for making planning decisions. The following questions were asked about the proposed mitigation strategies identified in Table 14:

- Does it reduce disaster damage?
- Does it contribute to other goals?
- Does it benefit the environment?
- Does it meet regulations?
- Will historic structures be saved or protected?
- Does it help achieve other community goals?
- Could it be implemented quickly?

STAPLEE criteria:

- **Social**: Is the proposed strategy socially acceptable to the community? Are there equity issues involved that would mean that one segment of the community is treated unfairly?
- **Technical**: Will the proposed strategy work? Will it create more problems than it solves?
- **Administrative**: Can the community implement the strategy? Is there someone to coordinate and lead the effort?
- **Political**: Is the strategy politically acceptable? Is there public support both to implement and to maintain the project?
- **Legal**: Is the community authorized to implement the proposed strategy? Is there a clear legal basis or precedent for this activity?
- **Economic**: What are the costs and benefits of this strategy? Does the cost seem reasonable for the size of the problem and the likely benefits?
- **Environmental**: How will the strategy impact the environment? Will the strategy need environmental regulatory approvals?

Each proposed mitigation strategy was evaluated using the above criteria and assigned a score (Good = 3, Average = 2, Poor = 1) based on the above criteria. An evaluation chart with total scores for each strategy can be found in the collection of individual tables under Table 14a – 14 j.

Table 14a: Mitigation Action: Review Existing Infrastructure

Criteria	Score
Does it reduce disaster damage?	3
Does it contribute to other goals?	3
Does it benefit the environment?	3
Does it meet regulations?	3
Will historic structures be saved or protected?	3
Does it help achieve other community goals?	3
Could it be implemented quickly?	3
S: Is it Socially acceptable?	3
T: Is it Technically feasible and potentially successful?	3
A: Is it Administratively workable?	3
P: Is it Politically acceptable?	3
L: Is there Legal authority to implement?	3
E: Is it Economically beneficial?	3
E: Are other Environmental approvals required?	3
Total	**42**

Table 14b: Mitigation Action: Repair/ Replace Infrastructure

Criteria	Score
Does it reduce disaster damage?	3
Does it contribute to other goals?	3
Does it benefit the environment?	2
Does it meet regulations?	3
Will historic structures be saved or protected?	3
Does it help achieve other community goals?	3
Could it be implemented quickly?	2
S: Is it Socially acceptable?	3
T: Is it Technically feasible and potentially successful?	3
A: Is it Administratively workable?	3
P: Is it Politically acceptable?	3
L: Is there Legal authority to implement?	3
E: Is it Economically beneficial?	3
E: Are other Environmental approvals required?	2
Total	**39**

Table 14c: Mitigation Action: Require Vegetation Setbacks

Criteria	Score
Does it reduce disaster damage?	3
Does it contribute to other goals?	2
Does it benefit the environment?	2
Does it meet regulations?	3
Will historic structures be saved or protected?	1
Does it help achieve other community goals?	2
Could it be implemented quickly?	2
S: Is it Socially acceptable?	2
T: Is it Technically feasible and potentially successful?	3
A: Is it Administratively workable?	3
P: Is it Politically acceptable?	2
L: Is there Legal authority to implement?	2
E: Is it Economically beneficial?	2
E: Are other Environmental approvals required?	2
Total	**31**

Table 14d: Mitigation Action: Increase Emergency Shelters

Criteria	Score
Does it reduce disaster damage?	1
Does it contribute to other goals?	1
Does it benefit the environment?	1
Does it meet regulations?	1
Will historic structures be saved or protected?	1
Does it help achieve other community goals?	2
Could it be implemented quickly?	3
S: Is it Socially acceptable?	3
T: Is it Technically feasible and potentially successful?	3
A: Is it Administratively workable?	3
P: Is it Politically acceptable?	3
L: Is there Legal authority to implement?	3
E: Is it Economically beneficial?	3
E: Are other Environmental approvals required?	1
Total	**29**

Table 14e: Mitigation Action: Update/Install Generators in Shelters

Criteria	Score
Does it reduce disaster damage?	2
Does it contribute to other goals?	3
Does it benefit the environment?	1
Does it meet regulations?	2
Will historic structures be saved or protected?	3
Does it help achieve other community goals?	2
Could it be implemented quickly?	3
S: Is it Socially acceptable?	3
T: Is it Technically feasible and potentially successful?	3
A: Is it Administratively workable?	3
P: Is it Politically acceptable?	3
L: Is there Legal authority to implement?	3
E: Is it Economically beneficial?	3
E: Are other Environmental approvals required?	1
Total	**33**

Table 14f: Mitigation Action: Electronic Signage

Criteria	Score
Does it reduce disaster damage?	2
Does it contribute to other goals?	3
Does it benefit the environment?	1
Does it meet regulations?	2
Will historic structures be saved or protected?	1
Does it help achieve other community goals?	3
Could it be implemented quickly?	3
S: Is it Socially acceptable?	3
T: Is it Technically feasible and potentially successful?	3
A: Is it Administratively workable?	3
P: Is it Politically acceptable?	3
L: Is there Legal authority to implement?	3
E: Is it Economically beneficial?	3
E: Are other Environmental approvals required?	1
Total	**34**

Table 14g: Mitigation Action: Update Emergency Operations Plan

Criteria	Score
Does it reduce disaster damage?	1
Does it contribute to other goals?	3
Does it benefit the environment?	1
Does it meet regulations?	3
Will historic structures be saved or protected?	1
Does it help achieve other community goals?	2
Could it be implemented quickly?	3
S: Is it Socially acceptable?	3
T: Is it Technically feasible and potentially successful?	3
A: Is it Administratively workable?	3
P: Is it Politically acceptable?	3
L: Is there Legal authority to implement?	3
E: Is it Economically beneficial?	2
E: Are other Environmental approvals required?	2
Total	**33**

Table 14h: Mitigation Action: Reverse 911

Criteria	Score
Does it reduce disaster damage?	2
Does it contribute to other goals?	2
Does it benefit the environment?	1
Does it meet regulations?	3
Will historic structures be saved or protected?	2
Does it help achieve other community goals?	3
Could it be implemented quickly?	2
S: Is it Socially acceptable?	3
T: Is it Technically feasible and potentially successful?	3
A: Is it Administratively workable?	3
P: Is it Politically acceptable?	3
L: Is there Legal authority to implement?	3
E: Is it Economically beneficial?	2
E: Are other Environmental approvals required?	2
Total	**29**

Table 14i: Mitigation Action: Update CIP

Criteria	Score
Does it reduce disaster damage?	2
Does it contribute to other goals?	2
Does it benefit the environment?	2
Does it meet regulations?	3
Will historic structures be saved or protected?	2
Does it help achieve other community goals?	2
Could it be implemented quickly?	3
S: Is it Socially acceptable?	2
T: Is it Technically feasible and potentially successful?	3
A: Is it Administratively workable?	3
P: Is it Politically acceptable?	3
L: Is there Legal authority to implement?	3
E: Is it Economically beneficial?	2
E: Are other Environmental approvals required?	2
Total	**34**

Table 11j: Mitigation Action: Evaluate Existing Hazard Training and Drills

Criteria	Score
Does it reduce disaster damage?	3
Does it contribute to other goals?	3
Does it benefit the environment?	2
Does it meet regulations?	3
Will historic structures be saved or protected?	2
Does it help achieve other community goals?	2
Could it be implemented quickly?	3
S: Is it Socially acceptable?	3
T: Is it Technically feasible and potentially successful?	3
A: Is it Administratively workable?	3
P: Is it Politically acceptable?	3
L: Is there Legal authority to implement?	3
E: Is it Economically beneficial?	3
E: Are other Environmental approvals required?	2
Total	**38**

After each strategy was evaluated and prioritized according to the final score. The highest scoring strategies were determined to be of more importance, economically, socially, environmentally, and politically feasible and, hence, prioritized over those that were lower scoring. This prioritizing was used as a basis for developing the Action Plan.

CHAPTER IX. IMPLEMENTATION SCHEDULE FOR PRIORITY MITIGATION STRATEGIES

This step involves developing an action plan that outlines who is responsible for implementing each of the prioritized strategies determined in the previous step, as well as when and how the actions will be implemented. The following questions were asked to develop an implementation schedule for the identified priority mitigation strategies:

WHO? Who will lead the implementation efforts? Who will put together funding requests and applications?

HOW? How will the community fund these projects? How will the community implement these projects? What resources will be needed to implement these projects?

WHEN? When will these actions be implemented, and in what order?

Table 15 is the Action Plan. In addition to the prioritized mitigation projects, Table 15 includes the responsible party (WHO), how the project will be supported (HOW), and what the timeframe is for implementation of the project (WHEN).

Table 15: Action Plan for proposed mitigation actions

Rank	Project	Responsibility/ Oversight	Funding/ Support	Estimated Cost	Timeframe
1	Review Existing Infrastructure	Emergency Management Director, Public Works	N/A	$0	2005
2	Repair/ Replace Infrastructure	Public Works, Board of Selectmen	CIP, PDM-C/HMGP	Unknown	2005 and ongoing
3	Evaluate Existing Hazard Training and Drills	Emergency Management Director, Fire Chief	N/A	$0	2005
4	Electronic Signage	Emergency Management Director, Public Works	PDM-C/HMGP	$50,000	2006
4	Update CIP	Board of Selectmen	N/A	$0	2005
6	Update/Install Shelter Generators	Emergency Management Director	PDM-C/HMGP	$20,000	2006
6	Update Emergency Operations Plan	Emergency Management Director	N/A	$0	2006
8	Require Vegetation Setbacks	Planning Board	N/A	$0	2005
9	Increase Emergency Shelters	Emergency Management Director	PDM-C/HMGP	Unknown	2006
9	Reverse 911	Emergency Management Director, Board of Selectmen	PDM-C/HMGP	$50,000	2007

CHAPTER X. MONITORING, EVALUATING AND UPDATING THE *PLAN*

Recognizing that many mitigation projects are ongoing, and that while in the implementation stage communities may suffer budget cuts, experience staff turnover, or projects may fail altogether, a good plan needs to provide for periodic monitoring and evaluation of its successes and failures and allow for updates of the *Plan* where necessary.

In order to track progress and update the Mitigation Strategies identified in the Action Plan (Table 8), it is recommended that the Town revisit the *Plan* annually, or after a hazard event. If it is not realistic or appropriate to revise the *Plan* every year, then the *Plan* will be revisited no less then every five years. The Emergency Management Director is responsible for initiating this review with members of the Town that are appropriate including members of the public. In keeping with the process of adopting the 2005 *Plan*, a public hearing to receive public comment on *Plan* maintenance and updating will be held during the any review of the *Plan*. This publicly noticed meeting will allow for members of the community not involved in developing the *Plan* to provide input and comments each time the *Plan* is revised. The final revised *Plan* will be adopted by the Board of Selectmen appropriately, at a second publicly noticed meeting.

Changes should be made to the *Plan* to accommodate for projects that have failed or are not considered feasible after a review for their consistency with STAPLEE, the timeframe, the community's priorities, and funding resources. Priorities that were not ranked high, but identified as potential mitigation strategies, should be reviewed as well during the monitoring and update of this *Plan* to determine feasibility of future implementation.