

TOWN OF WESTPORT NATURAL HAZARD DISASTER MITIGATION PLAN

Chapter One: Introduction

Purpose of the Plan

Westport is a community of great natural beauty. This beauty is closely tied to its coastal location, rural landscape, and riverfront areas. These features and the New England weather mean natural hazards are a fact of life in Westport with each season presenting its own challenge. Heavy spring rains, summer droughts, early fall hurricanes, or winter snowstorms can all impact Westport. The intersection of these natural hazards with the man-made environment can transform these routine events into natural disasters. This plan examines the natural hazards facing the Town of Westport, assesses the vulnerability of the area's residents and businesses, and makes recommendations on ways to mitigate the negative effects of typical natural hazards. The effort has drawn from the local knowledge of a group of officials and residents, and the recommendations presented are meant to be realistic and effective steps for mitigating natural hazards. Ultimately it is hoped that these actions will translate into savings – fewer lives lost, less property destroyed, and minimal disruption to essential services.

Development of the Plan

In April of 2004, the Westport Board of Selectmen appointed a local Pre-Disaster Mitigation Planning Committee and charged them with the development of this plan. A list of the Committee members is attached. The group included representatives from: Board of Selectmen, Emergency Management, Harbormaster, Highway Department, Fire Department, Police Department, and the insurance industry. The group held four (4) open meetings to discuss and develop the plan. The Southeastern Regional Planning and Economic Development District (SRPEDD) provided mapping and technical assistance, and this local plan is an annex to a regional plan for the SRPEDD southeastern Massachusetts region. After a public hearing on August 9, 2004 the Board of Selectmen adopted the plan.

Committee Membership

Clinton D. Boulds, Foreman
Highway Department

Richard B. Earle
Harbor Master

Brian Legendre, Deputy Chief
Westport Fire Department

Michael McCarthy
Westport Emergency Management Director

John McDermott
Westport Assessor Office/Insurance Industry Professional

Stephen Motta, Chief
Westport Fire Department

Keith Pelletier, Chief
Westport Police Department

Anne Phelps, Agent
Conservation Commission

Richard M. Tongue
Board of Selectmen

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Chapter Two: Profile of the Community

Geography, Geology, Topography, and Climate

- The Town of Westport is located in southeastern Massachusetts and is bordered by Fall River on the north and west; Dartmouth on the east; the Atlantic Ocean on the south; and Tiverton and Little Compton, Rhode Island on the west. Westport is about 8 miles south of Fall River, 8 miles west of New Bedford, 54 miles south of Boston, and 26 miles southeast of Providence, Rhode Island. It has a total land area of 51.55 square miles.
- Geologists classify the southeastern Massachusetts area as part of the Northeast Coastal Lowlands/Coastal Plain region. The area is characterized by the conditions created over 12,000 years ago when massive glaciers receded. These characteristics include: low hills; highly porous soils; deposits of sand and gravel; multiple swamps, lakes, rivers and ponds; and a high water table. The glaciers left behind glacial till that contains thick deposits of both sand and gravel, lying over bedrock. There are occasionally boulders, known as glacial erratics, of different rock types that were carried from northern regions and left behind as the glaciers receded. Westport has rolling hills with elevation changes from sea level to 233 feet above sea level.
- Westport is a waterfront community with over eight miles of direct frontage on Buzzards Bay and approximately 35 miles of shoreline between the East and West Branch of the Westport River. Beaches include the state Horseneck Beach, Cherry and Webb Beach, and East Beach. Other major water bodies include Davol Pond, Sawdy Pond, South Wattupa Pond, and Richmond Pond. Westport lies within the Buzzards Bay Watershed. Three areas in Westport are classified as barrier beaches: Horseneck Beach, East Horseneck Beach, and Little Beach. This classification affords these areas special protection. According to the Massachusetts Office of Coastal Zone Management (CZM) agency,

...barrier beaches are narrow, low-lying strips of beach and dunes that are roughly parallel to the coastline, and are separated from the mainland by a body of water or wetland. In 1980, Executive Order No. 181 was enacted to strengthen the protection of barrier beaches in Massachusetts. This order recognized that: the dynamic nature of the barrier is essential for barrier beaches to provide storm damage prevention and flood control; human-induced changes to barrier beaches can decrease these storm damage prevention and flood control capacities; inappropriate development on barrier beaches results in the loss of lives and property; and future storm damage to development on barrier beaches is inevitable due to sea level rise.¹

¹ <http://www.state.ma.us/czm/barrierbeachinventory.htm>. Accessed on April 29, 2004.

- Barrier and other beach areas are subject to change due to the forces of wind, waves, tides, sea level fluctuation, and climatic variation that influence the movement of sand. The loss (erosion) and gain (accretion) of coastal land is a continuous process. The CZM has interpreted data on shoreline change from maps and orthophotos covering the period of the early 1800s through 1994. CZM has mapped the amounts of change during this period and with the use of linear regression developed a model that estimates that communities in the south coastal area, like Westport, will lose .5 – 1.5 feet of shoreline per year, into the foreseeable future.
- The geography of Westport is such that the Horseneck Beach area could easily be separated from the rest of the mainland. The Route 88 connection is via a bridge and the land area where East Beach Road runs is roughly 800 feet wide – a strip that separates the Atlantic Ocean from the Let. This area is subjected to acute pressure during storm events, and portions of this roadway have been replaced a number of times, most recently post 1991 and 1985 hurricane events. The Old Harbor area is a more protected area, and Cockeast Pond can serve as a holding area during storm events.
- The 1999 Westport *Open Space and Recreation Plan* includes the following tables on recorded high water elevations during the last two major hurricanes, Carol of 1954 and the unnamed storm of 1938.

Recorded High Water Elevations in Westport 1938 & 1954 Hurricanes (ft, MSL)		
Location	1938 Hurricane	1954 Hurricane
Acoaxet Road	15.5-15.9	11-11.2
Horseneck Point	15.5	11.4
Horseneck Beach	NA	12.2
East Horseneck Beach	NA	12.1
Westport Point	NA	11.1
Westport R. – Hix Bridge	8.3	NA
Westport Harbor	9.6	9.6
Little Beach	NA	10.8
Source: 1999 Westport <i>Open Space and Recreation Plan</i> , p.43. Aubrey Consulting Inc., 1997.		

- There are four dams associated with the water bodies in Westport. The City of Fall River owns three of these dams and Hoyte Manufacturing owns the fourth. The records of the Massachusetts Bureau of Dam Safety indicate the following information on these dams:

Dams in Westport			
Owner	Caretaker	Dam Name	Hazard Code*
City of Fall River	Fall River Water Department	Noquochoke Lake Dam at Rte. 6	H
City of Fall River	City of Fall River	Sawdy Pond Dam	L
Hoyt Manufacturing	Hoyt Manufacturing	Forge Pond	S
City of Fall River	City of Fall River	Westport River Dam	L
* H= High; S=Significant, L=Low based on areas at risk if there was a failure. This is NOT a condition rating.			

- The Bureau of Dam Safety (BDS), a division of DCR, has jurisdictional authority over dams that meet the following criteria: dam structure six feet or higher, or impoundment of 15 acre feet² or more, or a significant downstream hazard as determined by staff review (e.g. campground, densely developed area, major thoroughfare, etc.). This includes government and privately owned dams. New regulations going into effect at the end of 2003 requires owners to register the dams and have them professionally inspected at the owner’s expenses, every two years. While the monitoring of dam condition falls to the owner, be it a private or public entity, damage from dam failure may include multiple owners and even property across town boundaries. Coordination between towns may be important, especially concerning the release of water to adjust levels before and during storm events. Given that Fall River owns three of the dams in Westport, communication is important.

- It was reported that a tree downed by a storm in 2000 or 2001 got caught in the Hoyt Dam. This tree started collecting other vegetative debris and presented a flooding threat. The dam owners needed to get sign installation equipment to remove the tree. In another circumstance, a small dam structure in Sam Tripp Brook near the East Branch of the river was flooded out during a heavy rain. This impacted one roadway, and was repaired by the private property owners.

Climate

- Massachusetts in general has a humid climate with temperatures that average 68 to 72 degrees in the summer and about 28 to 32 degrees in the winter. The National Climatic Data Center reports the following normal temperatures by season in Westport:

January	30.6 Degrees F
July	73.5 Degrees F

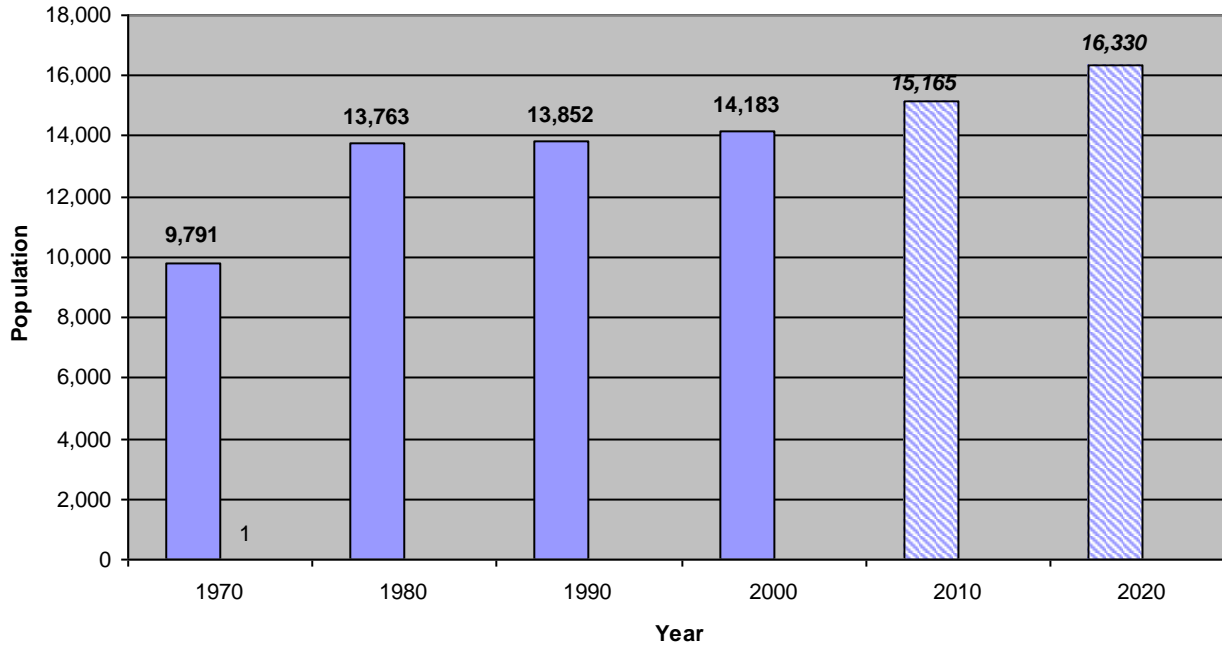
² Acre foot = Amount of water that fills one acre of land to a depth of one foot, approx. 300,000 gallons of water.

The mean annual precipitation is 47.3 inches. The growing season, from the last killing frost in the spring to the first killing frost in the fall, runs between 180 – 200 days. The area is subject to a variety of severe weather events: hurricanes, Northeasters, thunderstorms, blizzards, tornadoes, and drought. All of these are discussed more fully in the next chapter.

Population Characteristics and Political Structure

- The 2000 US Census indicates that Westport has a total population of 14,183. With a land area of 51.55 square miles the average population density is 275 persons per square mile. There is only a small portion in the northern section of town that is classified by the Census as urbanized; the majority of the land area is developed as a low-density rural/agricultural community. The population can be broken down by ages in the following manner: 652 (4.6%) under 5 years; 2,706 (19%) between 5 and 19 years old; 8,751 (62%) between 20 and 64 years old; and 2,074 (14.6%) 65 years or older. With a total of 5,386 households, the average household size is 2.63 persons.
- As a coastal community, Westport is subject to population swings during the summer months. The Census reports a total of 598 seasonal units. These units plus local places of accommodation such as Bed & Breakfasts, add to the year-round population. Natural disasters during the summer months are bound to involve a figure that far exceeds the year-round population of 14,183. According to the 1999 Westport Open Space Plan, the Horseneck Beach facility can see upwards of 650,000 visitors per season.
- Westport has experienced a steady population increase over the past thirty years, and is expected to continue this growth. The figure below indicates census population figures and growth projections prepared by SRPEDD & MassHighway.
- Additionally, Westport is home during the college school year to students from the campus of the University of Massachusetts at Dartmouth. These students find housing in winterized summer homes during the period of September – May.

Population Trends Westport, MA



- Consistent with national trends Westport has seen a steady increase in the absolute number of residents whom are over 65 years of age. This is a trend that is expected to continue as the “baby-boomer” generation ages. The number of residents over the age of 65 has increased from 1,379 in 1980 to 1,901 in 1990 and 2,074 in 2000. From 1990 to 2000 this segment of the population increased from 13.7 % of the total Westport population to 14.6 %. This population generally has a higher incidence of special needs for emergency response-- due to health afflictions and mobility restrictions—although overall this population is a healthier and more active group than they were thirty years ago. The Federal Administration on Aging notes the following as reasons the elderly are more vulnerable to disasters:
 - ✓ They have difficulty getting assistance due to progressive physical and mental impairments and other frailties that accompany aging;
 - ✓ They are slower to fill out forms for disaster notification and/or disaster relief assistance;
 - ✓ They are often at higher post-disaster nutritional risk and medication risk;
 - ✓ They are often targeted by fraudulent contractors; and

- ✓ They may be susceptible to abuse as overall family stress levels increase in the later stages of a disaster.³
- Other vulnerable populations are youth and the disabled. Youth are vulnerable due to their need for supervision and guidance in times of emergency—especially groups of children under the care of a limited amount of adults. This is best assessed at the local level through critical facilities identification of childcare centers and schools. These facilities are indicated on Westport’s map of twenty-eight critical facilities and include two daycare centers, five schools and two elderly facilities.
- The 2000 Census represents the first time that data on the disabled was collected. The Census long form allowed self-reporting by the respondent on questions that would indicate disabilities of various types:
 - sensory disability,
 - mental disability,
 - going outside the home disability
 - physical disability,
 - self-care disability,
 - employment disability.

The Census reports that Westport had a total of 2,137 respondents to these categories. Due to the ability to select more than one category, this translates into a smaller number of residents. The special circumstances of the disabled population that may affect disaster response include:

- ✓ the visually impaired are reluctant to leave familiar surroundings;
- ✓ those with mental retardation or cognitive impairment may not understand or may become confused;
- ✓ guide dogs and other assistance animals may become disoriented in a disaster;
- ✓ proper transport techniques are required to reassure anyone being carried that they will not be dropped;
- ✓ many respiratory illnesses are aggravated by stress;
- ✓ medically dependent individuals may not be able to communicate their needs; and
- ✓ all temporary shelters must meet accessibility standards.⁴

- Westport has a full-time Fire and Police Force.
- The governing body of Westport is a five member Board of Selectmen, with the legislative body being Town Meeting. Other elected positions include: Town Clerk, Moderator, Treasurer, Collector of Taxes, Assessors, Board of Health, School Committee, Regional School Committee, Highway Supervisor, Fish Commissioners, Constables, Library Trustees, Landing Commissioners, Housing Authority, Planning Board, and Board of Commissioners of Trust Funds.

³ “Disaster Preparedness for Older Americans”, 2002. Business Publishers, Inc.: Silver Spring, MD, p.1.

⁴ Ibid, p.20.

Transportation Network

- Westport has a total of 154.27 miles of roadway, seven bridges associated with the ramps of Rte. 195, and an additional seven bridges over water and other roadways. Route 88 and Main Road act as the major north/south routes. Routes 177, 6 and Interstate 195 serve as the major east/west routes. Three of the Westport bridges are listed as functionally obsolete and none as structurally deficient. Currently work is being completed on the bridge along Hix Bridge Road over the East Branch of the Westport River. This 4 million dollar project has the bridge operating as one lane with a signal to alternate the flow of traffic. The Fontaine Bridge is a drawbridge that connects Horseneck to the mainland. Work on this bridge has been ongoing for a number of years and is in part due to the aged electrical system.

<i>Westport</i>					
Miles of Roadway	Interstate	Arterials	Collectors	Local	Total
	3.66	15.3	36.54	98.77	154.27
Functionally Obsolete Bridges	Roadway	Over	Age	Owner	
	State Route 88 Northbound	Over I-195	Built 1965	MassHighway	
	Forge Road	Over Westport River East Branch	1938/rebuilt 1967	Town of Westport	
	Highland Avenue	Over Railroad	1927/rebuilt 1981	MassHighway	
<i>Source: SRPEDD and MassHighway</i>					

Land Use: Housing, Commerce, Industry and Agriculture.

- Statistics presented in the May 2000 Westport Master Plan, “*Setting A course for Our Future*” indicate the following breakdown of land uses for the 30,015 total acres of Westport in 2000:
 - 10,524 acres residential (35%)
 - 4,808 acres -undeveloped residential land (16%)
 - 517 acres forest (1.7%)
 - 8,529 acres farmland (28.4%)

- 371 acres recreation lands (1.2%)
 - 2,516 acres tax exempt land uses (8.4%)
 - 1,984 acres undevelopable (6.6%)
 - 694 acres commercial(2.3%)
 - 82 acres industrial (.3%)
- Residential growth has been steady. Between 1991 and 2000 inclusive, 792 residential building permits were issued, an average of 79 per year.
 - Westport is a rural community that maintains a sizeable amount of active agriculture including dairy farms, vegetable farms, and vineyards. Along with the farmland there is considerable livestock. The 1999 Westport *Open Space and Recreation Plan* reports that in 1997 there were 4,200 dairy cattle; 350 beef cattle; 400 goats, sheep and sine; and 50 horses or ponies.
 - There are five village areas in Westport: Head of Westport, Central Village, Westport Point, Westport Harbor, and “North Westport”. The housing stock in Westport is generally single- family homes (according to the 2000 Census 85% of all units are single family detached units) of which 57% were constructed prior to 1969. This may have implications for those located within the floodplain for the construction pre-dates floodplain zoning and construction standards. However, Westport’s participation in the National Flood Insurance Program does not indicate a major problem with repetitive loss structures. As indicated in the table below, 278 policies are in effect, and 102 claims have been paid since the program’s inception but only 3 properties are categorized as repetitive loss properties. This means that only these three have had two or more claims for flood related damage.

Westport and the National Flood Insurance Program (NFIP)					
Policies in Force (#)	Property Value Insured (\$)	Total # Losses Paid Out	Total Losses (\$)	Total Repetitive Loss Structures (Two or more Claims)	Total Repetitive Loss Claims Paid (\$)
278	47,234,700	102	1,073,388.05	3	87,000

- For many years the Westport River Watershed Alliance (WRWA) has been doing water quality monitoring along the river. One result of this work was the award to the Town of Westport of a \$264,332 grant from the state to construct a stormwater treatment wetland. Work on a specially engineered, constructed wetland began at the Head of Westport off Old County Road in November

of 2003. The project will divert untreated stormwater runoff into a wetland treatment area and then into the river. The project is not designed to address flooding issues.

- Along the barrier beach area of East Beach Road there are one-hundred privately owned lots that can be permitted for 6 months of trailer use. Westport has established a strict control for these sites in order to ensure evacuation as needed. More information on this is available in Chapter Three – Existing Protection Measures. There are two campground areas within the town, one the State facility at Horseneck Beach with 100 sites and the other a private campground, Westport Camping Grounds at 346 Old County Road, with 25 sites.
- There are approximately 1,200 moorings in Westport. The Coast Guard may require boats be moved inside the Let, above the Fontaine drawbridge when there is a threat. There are 3 public boat ramps in Town and several private facilities that are open for general use in emergency situations. Tripps Marina has the equipment to remove 200 boats in 24 hours.

Cultural and Historical Sites (on Critical Facilities Map)

- Westport has four individual properties listed on the State Register of Historic Properties and two historic district areas within Westport Point with a total of 350 structures. The historic cemeteries, ubiquitous stonewalls, and known and unknown archeological sites are also significant cultural and historical resources of the Town.

Utilities

- Only a small portion of northwestern Westport has municipal water service – predominantly White’s and Hampton Inn—provided from Fall River. The rest of the community has individual water and septic systems. Such systems are more vulnerable to power outages, as pumps in residential wells will not run without electricity. Individual homeowners would need generators to keep water running. All of Westport’s shelters have back up generators available to cover this need.
- Residents of Westport use the hospitals of St. Anne’s and Charlton in Fall River and St. Luke’s in New Bedford.

<i>Community</i>	<i>Electric Provider</i>	<i>Gas Provider</i>	<i>Water Source</i>	<i>Wastewater</i>	<i>Hospitals</i>
Westport	NSTAR/ Massachusetts Electric	New England Gas	Private wells	ISDS	St. Anne’s, Fall River Charlton, Fall River St. Luke’s, New Bedford

Conclusions

The following general characteristics, drawn from this profile, are relevant to the design of a disaster mitigation strategy:

- ✓ The southern end of Westport is particularly vulnerable to hurricanes.
- ✓ Westport's barrier beaches have mitigation and natural resource value.
- ✓ The seasonal population swell presents a unique challenge to Westport.
- ✓ The growth of the past two decades has brought to town many new residents who are unfamiliar with the danger posed by a major hurricane event.
- ✓ The substantial agriculture resources (crops and livestock) of Westport are at risk from natural hazards.
- ✓ The rural nature of the community makes communication more difficult.
- ✓ The sizeable number of boats in the harbor may present a hazard both from the perspective of removing them from harm's way prior to a storm and the damage they may cause if left to become flotsam in a storm.

Chapter Three: Hazard Identification and Risk Assessment

This chapter will discuss the natural hazards and evaluate the risk they pose residents, homes and businesses. Each natural hazard is identified and profiled with information on the hazard's dimensions, history, and risk factors. Risk will be examined in terms of the likelihood of the natural hazard occurring; the geographic area that the natural hazard could affect; and the impacts that could be expected. The "likelihood" or probability of an event occurring is determined by reviewing historical events and consulting expert opinion, while GIS mapping is used to evaluate the area that could be affected. Information on the development characteristics of Westport from the profile chapter is used to estimate the impacts of natural hazards on critical facilities, vulnerable populations, and infrastructure.

Westport uses the same Hazard Index (see Table 3-1) used by the Regional Community Planning Team, to rate the categories of natural hazards in terms of likelihood, location, and magnitude of impacts. Each of these criteria was rated with a point value along a scale as indicated in Table 3-2. The Hazard Index in Table 3-1 is a gross assessment that was used to shape the focus areas of Westport's Mitigation Plan.

The discussion here on risk assessment draws heavily from the discussion in the Regional Plan. Maps for this section are provided at the end of the chapter.

- A. Flood Related Hazards: Regional Maps Hurricane Data: Wind and Flood Related Hazards; Flood Data: Flood Related Hazards; Nor'Easters/Blizzards: Flood and Wind Related Hazards

The current draft of the state Hazard Mitigation Plan of 2004, records flooding as the number one hazard faced within the state.⁵ This is not surprising given that a number of natural hazards can cause flooding including: hurricanes, Nor'easters, thunderstorms, and winter storms. Westport has some flooding problems with the hundred-year floodplain following along the riverbank. Also, the East Branch of the Westport River is channeled at the Head of Westport. Flooding is a major concern associated with a full force hurricane. The growth of Westport has meant that impervious land has become pervious, increasing the amount of runoff from normal precipitation. According to MassGIS the total area developed during 1971 - 1999 was 2,153.26 acres or an increase of 6.5%.

⁵ Massachusetts Hazard Mitigation Plan, 2004 p 23.

Table 3-1

Natural Hazard	Likelihood/ Frequency	Impact Area Assessment	Severity/ Magnitude	Hazard Index* equally ranked
FLOOD RELATED HAZARDS > Riverine/Coastal Erosion/Dam Failures Thunderstorms Winter Storms > Coastal Storms Nor'easters Hurricanes	Highly Likely (3)	Medium (2)	Limited (1)	6 Pts. Rank #1
WIND RELATED HAZARDS > Hurricanes coastal Storms/ Nor'easters > Winter Storms Downspouts Tornadoes	Highly Likely (3)	Medium (2)	Limited (1)	6 Pts. Rank #1
FIRE-RELATED HAZARDS > Drought, Wildfires, Urban Fires > Flooding	Likely (2)	Medium (2)	Limited (1)	5 Pts.
GEOLOGIC HAZARDS > Earthquakes, Landslides, Sink Holes/ Subsidence	Possible (1)	Small (1)	Limited (1)	3 Pts. Rank #4

Table 3-2

FREQUENCY/ LIKELIHOOD		
POINT VALUE	CATEGORY	CHARACTERISTICS
3	Highly Likely	Near 100% Probability in the next year
2	Likely	Between 10 - 100% probability in the next year; or at least one chance in 10 years
1	Possible	Between 1- 10% probability in the next year; or at least one chance in the next 100 years
0	Unlikely	Less than 1% probability in the next 100 years

IMPACT ASSESSMENT		
POINT VALUE	CATEGORY	CHARACTERISTICS
3	Large	Relative to total land area and concentrations of population/structures and critical facilities
2	Medium	Relative to total land area and concentrations of population/structures and critical facilities
1	Small	Relative to total land area and concentrations of population/structures and critical facilities

MAGNITUDE/SEVERITY		
POINT VALUE	CATEGORY	CHARACTERISTICS
3	Catastrophic	Multiple Deaths. Complete shutdown of facilities for 30 days or more. Property severely damaged >50%.
2	Critical	Injuries and/or illness result in permanent disability. Complete shutdown of critical facilities for at least two weeks. Property severely damaged <50%, >25%.
1	Limited	Injuries and/or illness do not result in permanent disability. Complete shutdown of critical facilities for more than one week. Property severely damaged <25%, >10%.
0	Negligible	Injuries and/or illnesses are treatable with first aid Minor quality of life loss. Shutdown of critical facilities and services for 24 hours or less. Property severely damaged <10%.

(Source: State of North Carolina Emergency Management Agency)

Hurricanes

While New England is not the area of the United States most burdened by hurricanes, the Atlantic coast of the United States can expect to see an average of 2 major hurricanes every 3 years⁶ and New England can expect one major landfall in each decade.⁷ This is in part due to the geography of Massachusetts—its projection easterly into the Atlantic places it in the typical path of storms that originate in Cape Verde or the Bahamas. Hurricanes are tropical storms that obtain wind speeds of 74 miles per hour or greater and are accompanied by heavy rainfall. Since hurricanes are formed at sea, storm surge is a concern when hurricanes make landfall. The National Weather Service reports, “southern New England has been affected by forty-one such storms since 1900, 12 of which made landfall with significant impact.”⁸ Table 3-3 reflects the history of these events. The tracks of storms that made landfall within the region are reflected on the map, *Hurricane Data: Wind and Flood Related Hazards*. It should be noted, however, that these paths are neither indicators of future behavior nor the full representation of hurricane impacts in the region. The heaviest areas of hurricane damage are on the eastern side of landfall, as the storm moves in a large counter-clockwise spinning spiral. **The most damaging storms have made landfall and tracked to the west of this region-** including the major 1938 unnamed hurricane that made landfall in Milford Connecticut and the 1954 Hurricane Carol that made landfall in Old Saybrook, Connecticut. Mapping the paths of hurricanes that made landfall in the region since 1860 shows that eight hurricanes, of varying intensity, crossed the region. The inset tells a more complete story about hurricane damage, by indicating those hurricanes that made landfall as far west of the region as the Rhode Island border. Figures 3-1 and 3-2 indicate the frequency of hurricane events in southern New England during the past hundred years. Clearly, it is “**highly likely**” that southeastern Massachusetts, and thus Westport, will experience a hurricane.

TABLE 3-3			
History of southern New England Hurricanes			
	NAME	DATE	INTENSITY
<i>Twelve significant tropical cyclones impacted southern New England, 1900-1999. Storm intensity at landfall is given by the Saffir/Simpson scale or TS for tropical storm.</i>	Unnamed	7/21/1916	CAT 1
	Unnamed	9/21/1938	CAT 3
	Unnamed	9/14-15/1944	CAT 3
	Carol	8/31/1954	CAT 3
	Edna	9/11/1954	CAT 3
	Diane	8/18-20/1955	TS
	Donna	9/12/1960	CAT 2
	Belle	8/9-10/1976	CAT 1
	Gloria	9/27/1985	CAT 2
	Bob	8/19/1991	CAT 2
	Bertha	7/12-13/1996	TS
	Floyd	9/18/1999	TS

⁶ Jarrel et al, 4.

⁷ Vallee, D. “A Centennial Review of Major Land-Falling Tropical Cyclones in Southern New England.” Available at: www.erl.noaa.gov/er/hqx/tropical_cyclones.htm, p.2. Source: Vallee, D. “A Centennial Review of Major Land-Falling Tropical Cyclones in Southern New England.” [Available at: www.erl.noaa.gov/er/hqx/tropical_cyclones.htm]

⁸ Valle Centennial Review, 1.

Figure 3-1

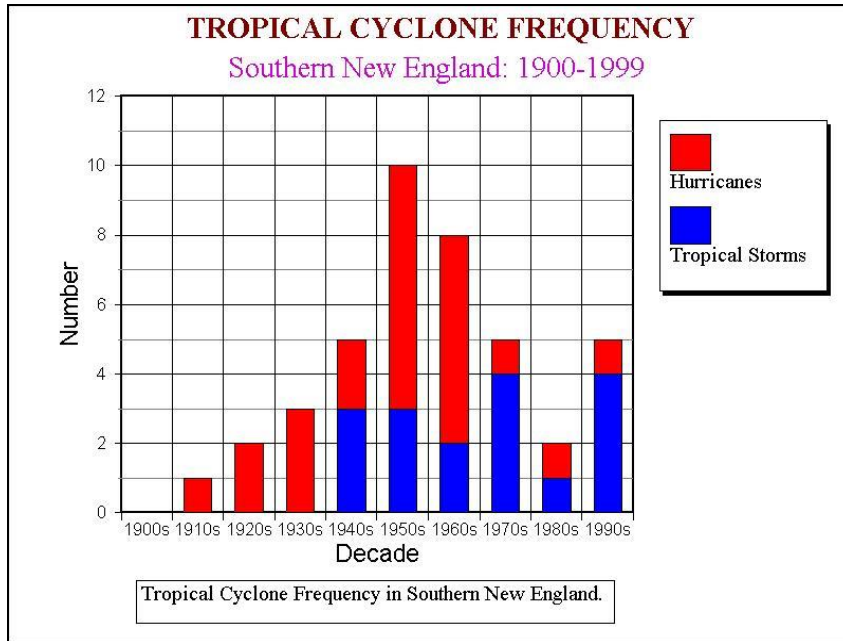
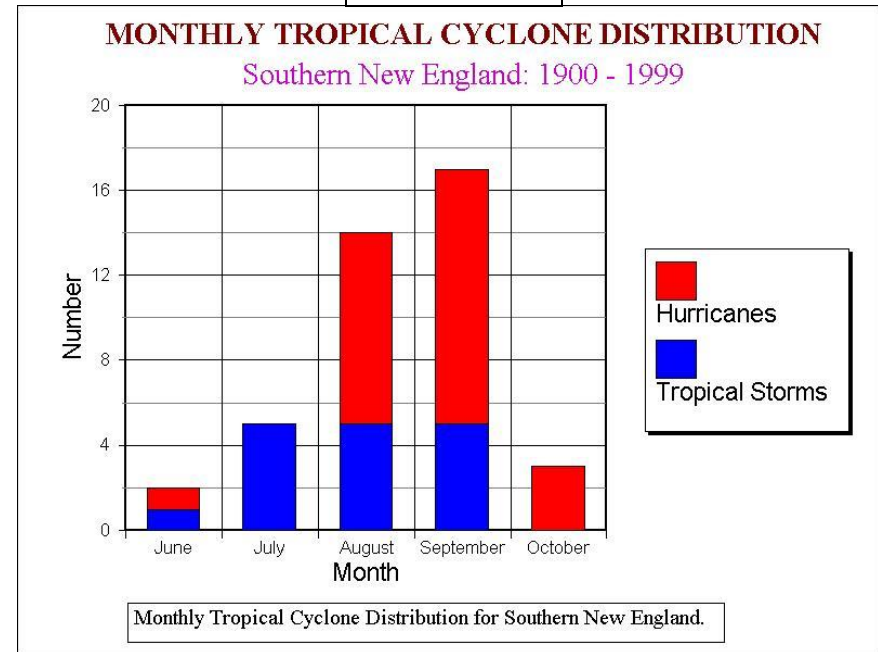


Figure 3-2



Vallee, D. "A Centennial Review of Major Land Falling Tropical Cyclones in Southern New England. [Available at: www.erh.noaa.gov/er/box/tropical_cyclones.htm], p.2.

Table 3-4 Saffir-Simpson Scale for Hurricane Classification			
Strength	Wind Speed (mph)	Pressure (millibars)	Storm Surge (feet)
Category 1	74-95	>980mb	4-5 ft.
Category 2	96-110	965-979mb	6-8 ft.
Category 3	96-113	945-964	9-12 ft.
Category 4	131-155	920-944	13-18 ft.
Category 5	>135	919	18 ft.
Tropical Cyclone Classification			
Tropical Depression		20-34 kt or 23-39 mph	
Tropical Storm		35-64 kt or 40-73 mph	
Hurricane		65+ kt or 74+ mph	

In assessing the magnitude or severity of damage from a hurricane in southeastern Massachusetts, consideration must be given to the timing of the event. Hurricanes that make landfall during high tide will have much greater storm surge and thus flood larger areas. In addition, hurricane season runs from June 1 to November 30, a period that includes the summer population swells experienced by several southeastern Massachusetts communities. As reported in the Profile Chapter, Westport has both an increase in the number of residents and an increase in the number of day visitors during the summer months. The timing of the storm relative to other weather events also has a bearing on the overall impact of the hurricane. If a hurricane follows another hurricane or a major rain event, the effects can be magnified as flooding is greater, and weakened or loosened trees are more susceptible to toppling.

Westport has a long history with hurricanes, including dramatic losses during both the 1938 and 1954 Category 3 events. In the 1938 storm 19 lives were lost and over 25 large Victorian homes destroyed. The 1954 storm also did great damage – 38 of 56 cottages on Horseneck were destroyed and several lives lost. After both the 1991 Hurricane Bob and 1985 Hurricane Gloria, sections of East Beach Road have had to be repaired

The severity of an event considers the potential for loss of life, property damage, and critical facility or business interruption. **Most experts anticipate that the next major New England hurricane will have severe impacts because present residents are unaware of the serious danger and major property investment has increased the value of structures in the region.** Given that the last major storm event was nearly twelve years ago, there is concern that those who have re-located to the area during this period or come of age during this period, are unaware of the real danger posed by a powerful hurricane. NOAA (National Oceanic and Atmospheric Administration) estimates that 80-90% of the population now living in United States coastal areas has never experienced a major hurricane.⁹ This lack of firsthand knowledge can cause lax response to warnings and poor or little preparedness.¹⁰ When residents are slow to respond to warnings the severity of impacts can be expected to be greater.

The new population has come with increased residential construction. As described in the Profile section, Westport has had new housing constructed to accommodate the population growth of an additional 420 persons during the years 1980 - 2000. Also worth noting is that this period has been a fairly prosperous one with smaller coastal homes being torn down and replaced by large expensive structures. Thus, in terms of dollars amount of damage, it is likely that a major storm will result in a higher amount of property damage than prior events.¹¹ Given the rating categories within severity of impacts (see Table 3-2), “**limited**” described, as “complete shutdown of critical facilities for more than one week, up to 25% property damage, and injuries but no permanent disabilities” appears

⁹ “Hurricanes: Unleashing Nature’s Fury”, August, 2001, ARC 5030, NOAA/PA 94050, p.8.

¹⁰ Jarrell, J. “The Deadliest, Costliest, and Most Intense United States Hurricanes from 1900 – 2000. NOAA Technical Memorandum NWS TPC-1, [Available at www.aoml.noaa.gov/hrd/Landsea/deadly/index.html], p. 8.

¹¹ Pielke, Jr. R.A. and C. W. Landsea 1998 “Normalized Hurricane Damages in the United States: 1925-1995”, Weather and Forecasting, 13:621-631. [Available at: www.aoml.noaa.gov/hrd/Landsea/Usdmg/index.html].

to fit the severity of damages Westport could expect. Of course, a powerful storm on a particular tract could inflict much greater damage.

Nor'easters, Winter Storms, and Thunderstorms

The Massachusetts Hazard Mitigation Plan reports that while hurricanes strike the area with much more force than Nor'easters, the state suffers more damage from Nor'easters because they are a more frequent occurrence.¹² Nor'easters are a common winter event in New England (1-2 each year¹³) and they bring high winds and sustained rains. They are more problematic in part because they have a longer duration – 12 hours to 3 days, versus 6 to 12 hours for hurricanes. Many southeastern Massachusetts communities will have flooding associated with the heavy precipitation of Nor'easter storms. Problems can be exacerbated when the rains fall and the melting of snow and ice is added to the flow. The large chunks of ice that are freed can clog drainage passages and increase localized flooding. This flooding can affect private residences, businesses, and public infrastructure such as roadways and storm drains.

The hazard map for Westport, *Nor'Easters & Blizzards* indicates the snowfall pattern. Westport falls within a band of lower average annual snowfall 24.1 to 36 inches per year. According to NOAA, the greater Providence area (covering the western section of southeastern Massachusetts) has a 20% chance each year of having at least 1 snowfall amounting to 12 inches or more, and is likely to experience 9.88 snowstorms each year. The greater Boston area (covering the northern/central area of southeastern Massachusetts) has a 33% chance each year of having at least 1 snowfall amounting to 12 inches each year and is likely to experience 10.33 snowstorms annually.¹⁴ Westport is most accurately placed within the Providence area. While melting snow adds to flooding, snowfall also presents a non-flooding hazard as access to critical facilities may be compromised by large amounts of snowfall. Variations on this hazard are a snowstorm in combination with rain that produces a very heavy wet snow or ice storms both of which weigh down trees and power lines. As a community without a public water supply, the loss of power in Westport results in each homeowner and business that lacks a back-up generator, being without running water.

In February of 2004, the American Meteorological Society initiated a rating scale for winter storms. The Category 1- 5 scale is intended to be used to assess damage rather than predict impacts. Snowstorms are difficult to predict and small temperature

¹² Massachusetts Hazard Mitigation Plan, 1999, p.11.

¹³ Ibid.

¹⁴ <http://www.erh.noaa.gov/box/climate/snow-climate.html>

fluctuations mean the difference between snow and rain. The scale that includes by increasing intensity- notable, significant, major, crippling and extreme storms- assesses the amount of snow, area affected, and population impacted.¹⁵

Table 3-6 Northeast Snowfall Impact Scale					
Category	Cat 1 Notable	Cat 2 Significant	Cat 3 Major	Cat 4 Crippling	Cat 5 Extreme
Snow Depth	4-10 inches	10+ inches	10-20 inches	20+ inches	10,20 or 30 inches
Area	Size of RI	Southern New England	1-3 times NY State	Northeast	Northeast
Population Affected	10 million	10-20 million	20-40 million	50 million	60 million
<i>(Source: American Meteorological Society)</i>					

Riverine Flooding and Dam Failures

As indicated by the Critical Facility and Flood map, the 100-year floodplain areas in Westport are located along the riverine corridors. The regional map, “Land Use/Flood Zone Analysis” indicates land area within the 100- year floodplain that as of 2000 was undeveloped and not preserved in perpetuity. The area for Westport is rather small – approximately 1,272 acres or 3% of the total land area. **In order to decrease future flooding damage and preserve areas to hold floodwaters, Westport should consider the mitigation value of conserving these properties when setting priorities for acquisitions and conservation restrictions.** Further evaluation should be undertaken to assess whether this land area is the rear portion of developed lots, wetland areas or in any other way restricted from development.

The Massachusetts Bureau of Dam Safety reports that the region’s dams, like the other parts of New England infrastructure, are an aging infrastructure that is expensive to repair. Routine maintenance is necessary to control the growth of trees and keep the area clear so defects can be detected. In addition to aging, the region’s dams are often doing work beyond their original design. The increase in impervious surfaces leads to increased flows in some streams and rivers and thus greater demands are placed on the dams. In 2003, a dam in a north shore community “overtopped” after heavy precipitation. When this happens the dams can fail quickly as the earthen structures are subject to erosion pressures. The City of Fall River has ownership of the majority of Westport’s dams. Communication between Fall River officials and Westport officials should occur to ensure that relevant information on conditions are shared.

¹⁵ Allen, Diane. “Snow Watchers now rate the effects from 1-5.” *The Boston Globe*, March 17, 2004, p.B4.

The Riverways Program within the Massachusetts Department of Fisheries, Wildlife, and Environmental Law Enforcement (DFWELE), has been studying the larger environmental costs of both operational dams and dam failures. Dam failures may cause loss of life and property downstream, but they may also degrade the environment. Many dams act as a holding area for contaminated sediments. With a dam failure, these sediments are released and can damage wildlife and the ecology of the river system. An associated cost of dam failures is the potential for such destruction to affect fish ladders or culverts for directing water. The Riverways program is looking to develop an assessment tool for evaluating dams for all aspects of safety, including environmental safety.

In summary, flooding due to a variety of causes (hurricanes, Nor'easters, thunderstorms, winter storms, dam failure) is **highly likely** in Westport, and would affect a large geographic area and population base thus having an **impact of medium** degree. The **severity** of the impacts on persons, property, and public infrastructure can be expected to be significant but **limited**.

B. Wind Related Hazards: Regional Maps Hurricane Data: Wind and Flood Related Hazards; Tornado Data: Wind Related Hazards; Nor'Easters/Blizzards: Flood and Wind Related Hazards;

A number of the storm events discussed under "Flood Related Hazards", also represent wind hazards to the region. Hurricanes and Nor'easters typically have high winds that can topple trees, knock out power lines, and carry dangerous debris. Consistent with flooding, the occurrence of these storm events can be expected to be "**highly likely**", that is the frequency of 1-2 times each year means that southeastern Massachusetts communities need to be prepared for high wind events. Wind has primary and secondary impacts. That is, property damage may occur as roofs are blow off or power lines blown down, but this is often followed by secondary impacts as the debris from one structure is blown into another structure or vehicle, and downed power lines cause fire or electrocution.

The Westport map *Hurricane & Tornado* reflects the 100-year wind exposure zones defined by the American Society of Civil Engineers (ASCE) construction standards. The wind exposure standard is used to determine the construction needed to withstand an average wind gust lasting 3 seconds at 33 feet off the ground. Approximately 2/3 of Westport is in the 120 mph zone, with the 1/3 closest to the open water classified as 130 mph zone. The ASCE standards are only used for high-rise structures, but the mapped zones indicate wind patterns as determined through readings and modeling. These patterns are consistent with the general regional weather patterns that indicate inland areas have less severe winds than coastal areas.

Occasional contributors to wind hazards are tornadoes. Since 1950, the southeastern Massachusetts region has experienced 15 tornadoes but as indicated on the Westport map, *Hurricane & Tornado* none were in Westport. Table 3-7 lists the dates and intensity

of the event as determined by the tornado Fujita Scale, which is detailed in Table 3-8. Within this region, tornadoes tend to be more likely in the months of May – September and the hours of 3 – 6PM. The National Weather Service reports that despite technological advances in equipment, the warning window for a tornado is still only about 2 minutes. In addition, this warning is very general, typically covering an area as large as a county.¹⁶ Massachusetts ranks nationally as 35th in occurrences of tornadoes for the period 1950 – 1995, but 16th in fatalities and 12th in property damages based on these same events.¹⁷ Massachusetts can expect on average, three tornadoes per year through out the state.¹⁸ Tornadoes and other natural hazards that bring high winds, can affect the entire southeastern Massachusetts region. Thus all populations are vulnerable, but given that 38% of tornado fatalities are in mobile homes¹⁹, mobile home park residents are a more vulnerable group than the general population. The higher fatalities does not reflect the fact that mobile home parks are more likely to be hit by a tornado, but rather that if hit mobile homes are more vulnerable to damage. According to the 2000 census there are only 13 mobile homes in Westport.

Table 3-7 Tornadoes 1950 – 1995 Bristol & Plymouth Counties		
Bristol County	Date	F-Scale
	June 9, 1953	F3
	September 7, 1958	F0
	August 9, 1968	F1
	August 9, 1968	F1
	August 2, 1970	F1
	August 28, 1970	F2
	September 14, 1972	F0
Plymouth County	Date	F-Scale
	September 7, 1958	F0
	July 4, 1964	F1
	June 9, 1965	F0
	November 18, 1967	F2
	August 9, 1968	F1
	September 16, 1986	F1
	July 10, 1989	F1
	July 10, 1989	F0

¹⁶ Interview with Glenn Field, July 2003.

¹⁷ http://nebraskaweather.unl.edu/severe/USspc_state_tornado_information_alpha_2.htm

¹⁸ <http://www.ncdc.noaa.gov/img/climate/severeweather/small/avgt5095.gif>

¹⁹ <http://nebraskaweather.unl.edu/severe/USstornfacts.htm>

Table 3-8 Fujita Tornado Damage Scale		
SCALE	WIND (MPH)	TYPICAL DAMAGE
F0	< 73	Light Damage: Some damage to chimneys; branches broken off trees; shallow-rooted trees pushed over; sign boards damaged
F1	73-112	Moderate Damage: Peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos blown off roads.
F2	113-157	Considerable Damage: Roofs torn off frame houses; mobile homes demolished; boxcars overturned; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground
F3	158-206	Severe Damage: Roofs and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted; heavy cars lifted off the ground and thrown.
F4	207-260	Devastating Damage: Well-constructed houses leveled; structures with weak foundations blown away some distance; cars thrown and large missiles generated.
F5	261-318	Incredible Damage: Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 100 meters (109 yds); trees debarked; incredible phenomena will occur.

In summary, wind damage due to a variety of causes (hurricanes, Nor'easters, winter storms, tornadoes) is **highly likely** in Westport, and would affect a large geographic area and population base thus having an **impact of medium** degree. The **severity** of the impacts on persons, property, and public infrastructure can be expected to be significant but **limited**.

C. Fire-Related Hazards: Regional Map Forest Vegetation and Wildfire Data: Fire Related Hazards

Wildfires are a natural part of the southeastern Massachusetts ecosystem. Fires keep the forest floor clean of debris, encourage the growth of grasses that serve as wildlife feed, and ensure that trees have plenty of room to grow. Natural fires, recurring in a cyclical manner, can recycle nutrients and create a diversity of natural habitats. In these ways, wildfires that occur in isolated areas can be a positive force. Increasingly, however, development is encroaching into isolated areas and wildfires present a danger to human life and manmade facilities. **Forest fires that were in remote areas are now forest fires in people's backyards.** The dual issues of human suppression of forest fires and human encroachment into forest areas, has increased the risks associated with wildfire. Portions of

southeastern Massachusetts are classified as “pine barrens”. These are areas where the vegetation is predominately pitch pine with an understory of scrub oak and black huckleberry. Not only is this vegetation highly flammable, the ecosystem of the pine-barrens relies on periodic fire to perpetuate the barrens.²⁰

The dispersion of growth into rural and undeveloped areas described in the Profile Chapter is consistent with the national phenomenon documented in discussions of the Wildlands/Urban Interface. The Wildlands/Urban Interface is getting attention because as development (particularly low-density residential development) pushes into flammable vegetative areas the threats of wildfires increase. Westport does have low-density development sited within forested landscapes.

Vegetation Type	Acres	Percent of Total*
Pitch Pine/Scrub Oak	120,332.00	23 %
Northern Hardwood	41,423.49	8 %
Red Maple Dominant	19,191.91	4 %
Oak/Maple Birch	3,908.96	1 %
Open Meadow	7,283.46	1 %
Forested Wetlands	56,101.70	11 %
Mixed Hardwood Pine	42,023.78	8 %
Suburban Forest	92,233.93	18 %
Water Bodies/Beaches/No Vegetation	132,883.69	26 %

The Westport map, *Wildfire* indicates vegetative coverage of the region that can be used to assess flammability. Pitch pine/scrub oak vegetation is resinous and waxy, characteristics that make it the most highly flammable vegetation in the region. The red areas on the Forest Vegetation Map are pitch pine/Scrub oak vegetation. Westport has a history of wildland fires including a major beach fire in 1949-50 that burned all of the Horseneck Beach area. This fire was fueled by the strong winds along the coast. Today several homes and a boatyard are located in this area. Wildfires and brush fires are not uncommon in Westport. Fire Department records indicate from 1994-2001 annual wildfires of ¼ acre or more ranged from a low of 6 to a high of 18 in a year. The Fire Department notes that

²⁰ Barbour, Henry et al, “Our Irreplaceable Heritage: Protecting Biodiversity in Massachusetts” 1998, p.46-7(NHESP & MA Audubon).

these brush fires tend to peak in the later part of the burning season (March/April) when residents are conducting permitted burning but things get out of hand.

The types of injuries that wildfire can cause include: loss of life, loss of property, and environmental damage. Fighting fires relies on having adequate access to the area and sufficient water. Since there is no public water supply, Westport relies on tanker trucks and fire ponds for fighting wildfire and structural fires. In conclusion, the probability of wildfire in Westport is “**likely**” and the area that could be affected is rated along Table 3-2 as “**medium**”. The severity of the impacts that could be expected from wildfire in the region are best categorized as “**limited**”, and would include property damage, injuries and disruption of critical facilities.

Drought

Drought is the main factor that determines the intensity of a wildfire season - the less moisture present in trees and vegetation, the more likely they are to ignite and the hotter they will burn. Table 3-11 indicates the amount of time it takes for vegetation to dry after rainfall, to reach its point of flammability.

Table 3-11 Drying Hours to Reach Flammability	
Size of Fuel	Hours Post Rain to Reach Flammability
¼" diameter or less	1 hour
¼ – 1" diameter	10 hours
1 - 3" diameter	100 hours
4 – 7" diameter	1,000 hours
8" + diameter	10,000 hours
<i>Source: MA Bureau of Fire Control.</i>	

Beyond its role as a factor leading to wildfire, drought also has impacts on public safety for all firefighting activity, agricultural production, and economic vitality of large users such as golf courses or industrial processes. According to the December 2001 Draft Massachusetts Drought Management Plan, Massachusetts generally has enough precipitation to support the demands residents and businesses place on water. Periods of drought are not unheard of though, with the 1960s and more recently 1999 – 2000 and 2002 being notable times of water stress in the southeastern region.²¹

²¹ Working Draft: Massachusetts Drought Management Plan, p4, December 21, 2001.

D. Geologic Hazards – Regional Map Earthquake Data: Geological Related Hazards

The hazards that present the least risk to southeastern Massachusetts are geologic hazards such as earthquakes and landslides. The United States Geological Service (USGS) categorizes the region as one of low risk for earthquakes, although small-scale earthquakes (under 3 on the Richter scale) are common in the region. The Weston MA Observatory of Boston College tracks earthquake activity throughout New England and reports that recent earthquakes in the vicinity of this region include an April 1996 3.5 Mn magnitude in Swansea; a July 11, 2002, 3.0 Mn magnitude in Martha’s Vineyard; and a February 23, 2004 2.0 Mn magnitude in Dartmouth.

The Westport hazard map, *Earthquake* indicates that there were no recorded earthquakes in Westport for the period 1690- 2004. Also indicated is Westport’s classification within 1-3% Peak Ground Acceleration (PGA) zone, labeled as light shaking, no damage. The PGA zones are based on modeling data that indicates areas where there is a 10% chance in the next fifty years of an earthquake exceeding the PGA for that zone. PGA is a measurement that compares the shaking of the ground with the force of gravity. While the likelihood of a powerful earthquake in the region is low, the actual risk is high because of how old the buildings are and because few structures have been built to withstand earthquakes. Critical infrastructure such as bridges and dams would be vulnerable. Overall the likelihood of a geological hazard in the region is considered to be **possible** but the type of event would be such that the impacts would be **small** and the severity **limited**, because earthquakes in the area are typically very small.

Table 3-11 Richter Scale	
M= 1-3	Recorded on local seismographs, but generally not felt
M= 3-4	Often felt, no damage
M= 5	Felt widely, slight damage near epicentre
M= 6	Damage to poorly constructed buildings and other structures within 10's km
M= 7	"Major" earthquake, causes serious damage up to ~100 km
M= 8	"Great" earthquake, great destruction, loss of life over several 100 km
M=9	Rare great earthquake, major damage over a large region over 1000 km

Chapter Four: Existing Protection Matrix Town of Westport

The following table lists mitigation actions by category that the Town of Westport presently has in place.

<i>Category of Protection Measure</i>	<i>Description</i>	<i>Area Covered</i>	<i>Effectiveness and/or Enforcement</i>	<i>Improvements or Changes Needed</i>
Capital Improvement Planning/ Structural Improvements	Capital Improvement Planning Committee in place. Prepares CIP on an annual basis covering a 5-year cycle.	Town-wide	Funding on as possible basis. FY'03 \$235,000 requested \$ 67,500 approved	The town struggles to fund CIP items and maintain a sufficient operating budget. See attached current listing including dredging request that was denied.
	Dredging Around Town Wharf	Harbor area	Will keep channel open for 5- 10 years depending on storm events.	Dredging as a routine maintenance item needs to be explored.
	TIP projects	Town wide	2 bridge projects underway – Hixbridge and Drawbridge on Rte. 88	Additional funding required to complete waiting projects.
Regulations/ Bylaws/Codes	Floodplain Zoning	NFIP defined areas	Variances rarely given Few repetitive loss structures in town (a total of 3)	None
	EPA Phase II Stormwater Treatment	Census urbanized areas	One project underway at Head of Westport	None

Regulations/ Bylaws/Codes (cont.)	Upland requirements for residential lots- a minimum of 30,000 of lot must be upland.	Town-wide	Each residential lot must have adequate upland area – this protects floodplain areas by giving the resident enough useable land area for building and landscaping, i.e. prevents encroachment in floodplain/wetland areas.	None
	Subdivision Regulations- underground utilities required	Town-wide	Enforced.	None
	Trailer permits for East Beach area	100 existing lots in East Beach area.	Very effective – strictly controlled so the Town can remove as necessary, requires annual renewal process.	None
	Soil Conservation Regulations- regulations that could impact sedimentation build up in waterways as a result of run-off from sand and gravel operations.	Town-wide	Adequate.	Could use erosion and sediment control standards. Given that the Conservation Commission serves as the Soil Board it is likely that some type of hay bale system is required, but there is nothing explicit in the regulations.
Operations, Administration, and Enforcement	Tree Maintenance	Town-wide within public street ROW	As funding permits within Highway Department workload and the power company utilizes subcontractors to complete work on a regular basis.	More funds
	Inter-department Emergency Coordination through Local Emergency Planning Committee	Town-wide	Meets on as needed basis.	Better radio equipment

Operations, Administration, and Enforcement (cont.)	Disaster Warning System	Town-wide	Cable TV; radio stations, also use door-to-door – often most effective.	None
	Auto Dial System	Town-Wide	Makes daily check-in calls to shut-ins referred by the COA or relatives. Used in case of pending storm event, too.	Could be expanded for use as a warning system to all households or remote households.
	Radio Communication	Town-wide	Interoperability achieved for Police/Fire/Highway	Could use additional portable radios for volunteers in times of disaster.
	Maintenance of Drainage Facilities	Town-wide	On an as needed basis, routine annual program followed as permitted within the Highway Department workload.	None
Planning	Comprehensive Plan addresses flooding issues and acquisition of sensitive areas	Town-wide	Part of consideration for purchases; CPA funds provides \$ for land acquisition on annual basis.	None
	Open Space Plan addresses acquisition priorities	Town-wide	Includes objectives and actions relative to purchasing land in velocity zones and protecting beach areas and restoring dunes.	None
Education & Training	Training available. In 2004 Westport organized a regional training for 10 volunteers.	Town-wide	Low participation.	Get creative on ways to integrate this training into other programs.
	Some educational speaking arranged.	To special interest groups as requested.	Adequate	Could do more.

	Wide range of materials available at town hall on preparedness.	Town-wide	Adequate	Try to widen distribution – consider mailing with tax bill or utility bill.
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Chapter Five: Proposed Pre-Disaster Mitigation Actions Town of Westport

The following table represents recommended mitigation actions. Some of these activities will require grant funding, others will require the cooperation of other agencies. The Town of Westport will make a good faith effort to implement these actions within the constraints of the local budget, staff resources, and new demands from state and federal agencies.

GOAL: Reduce the loss of life, property, infrastructure and cultural resources from natural disasters.

<i>Objective</i>	<i>Action</i>	<i>Responsible Party</i>	<i>Timeline</i>	<i>Resources Needed</i>
Undertake Capital and Structural Improvements that contribute to disaster mitigation.	(1) Explore a Maintenance Dredging Plan for the harbor and channels that establishes a regular dredging cycle. Look into a regional initiative to share equipment.	BOS/Harbor Master with Others/State agencies/ Coast Guard, etc.	Next ten years	Complicated initiative but much to be gained by streamlining permitting and sharing equipment costs.
	(2) Pursue regular dune restoration with proper regulatory oversight- do not support dune creation that is not consistent with Best Management Practices.	Conservation Commission/State Waterways program/	Ongoing	Expensive proposition – beyond the capacity of the town. Funds will be needed from federal, and state agencies/grants.

	(3) Make corrections to East Beach Road to prevent repetitive wash out problem. This has been a regular post-storm repair due to the severe coastal erosion. MA DCR/Waterways indicates beach reconstruction preferred option but need public access agreement across private property.			Extensive study under Waterways guidance does not recommend opening the let or armoring the beach. Instead adding sand to build up the beach and moving the road toward the Let are recommended. This issue needs more discussion so a resolution can be designed.
	(4) Construct an additional salt storage shed. For adequate road maintenance activities that promote safe access by emergency vehicles in times of storm events and minimize damage to vehicles caught in poor conditions.	Highway Surveyor submits to CIP committee.	Annual until funded.	Programmed into CIP as funding is available.
Adopt additional Bylaws to address disaster mitigation, in particular flooding.	(5) Add erosion and sedimentation standards to Soil Conservation Regulations.	Conservation Commission	Next 1- 3 years	Technical assistance may be possible through SRPEDD Municipal Assistance program or the Soil Conservation Service.

Improve local Operations, Administration, and Enforcement to support disaster mitigation.	(6) Expand Radio Equipment for Preparedness and Response	Police/Fire/EMS/ Emergency Mgt./LEPC	Next 5 years	Look for grant funding of additional portable radios to augment existing equipment. Presently all full time police officers and fire department members have portable radios. An additional 30 radios would be helpful for storm preparedness and response.
	(7) Request Dam Condition Reports from dam owners under new MGL – Chapter 253 Sect.46	Town Administrator; forwarded to appropriate bodies.	Next 2 years	Need a person to follow through, making sure any corrective action needed is pursued.
	(8) Expansion of auto-dial system for use as storm warning system.	Police/Emergency Mgt./LEPC	Next 5 years	Pursue funding to do a mailing; data entry; and system upgrade so the auto-dial equipment can be used to notify all residents of storm event. This is especially useful in rural community like Westport.
	(9) Purchase radio system that connects into federal/state police emergency frequency for use during major emergency. Presently can borrow these through New Bedford but Westport may need them at the same time as New Bedford.	Emergency Mgt./LEPC		Pursue grant funding for purchase.

	(10) Purchase wireless laptops for police cruisers. These can be used to access relevant information on weather conditions and local data on residents when officers are in the field during disaster warning periods.	Police/LEPC	Next 5 years	Pursue grant funding for this equipment.
Integrate disaster mitigation into ongoing Planning efforts.	(11) Update Pre-Disaster Mitigation Plan on a regular 5 year cycle – coordinate with CEM update and Open Space update	Emergency Mgt Director/ Conservation Commission Agent	Ongoing	Limited amount of work – if looks to be excessive can apply to MEMA for funding.
Run Education & Training programs on disaster mitigation, especially coastal storms.	(12) Hurricane awareness and preparedness program.	Emergency Mgt with LEPC	Next 2 years	Pursue grant funding for the preparation of a hurricane mailer that includes local stories and current information. Include funds for mailing.
	(13) Consider becoming a NOAA certified “Storm-Ready” community.	Emergency Mgt with LEPC	Next 2 years	May require some grant funding to become certified.