"DRAFT" MONTACHUSETT HAZARD MITIGATION PLAN 2014

Ashby
Ashburnham
Athol
Ayer
Clinton
Devens
Fitchburg
Gardner
Groton
Harvard
Hubbardston
Lancaster
Leominster
Lunenburg
Petersham
Phillipston
Royalston
Shirley
Sterling
Templeton
Townsend
Westminster
Winchendon

Prepared by:

Montachusett Regional Planning Commission (MRPC)
1427R Water Street, Fitchburg, MA 01420

Montachusett Regional Planning Commission
Commonwealth of Massachusetts

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1. Introduction and Overview

Background

A natural hazard is defined as "an event or physical condition that has the potential to cause fatalities, injuries, property damage, infrastructure damage, agricultural loss, damage to the environment, interruption of business, or other types of harm or loss (MEMA & DCR, 2010)". The Federal Disaster Mitigation of Act of 2000 requires all municipalities that wish to be eligible to receive FEMA hazard mitigation grants (see http://www.mass.gov/eopss/agencies/mema/hazard-mitigation/) to adopt a local hazard mitigation plan and to update the plan every five years. A community plan identifies actions to be done now to help alleviate disaster conditions in the future. The Commonwealth of Massachusetts is seeking to ensure that all 351 of its municipalities develop a local mitigation plan. However, not every municipality has the capacity to develop hazard mitigation plans on their own. The state is therefore enlisting the help and technical assistance of the 13 Regional Planning Agencies (RPAs) across the state. RPA's are quasi-governmental agencies that regularly work on projects on region-wide importance, and the state is asking them to work with the municipalities in their region and to prepare one overarching mitigation plan for the region that includes data for each jurisdiction. The plan update was funded by the Federal Emergency Management Agency (FEMA), the Massachusetts Emergency Management Agency (MEMA) and the MRPC.

This plan is the update of the 2008 Montachusett Region Hazard Mitigation Plan. The 2008 Regional Plan had annexes for each individual community. The Regional Plan has been converted into a Multi-Jurisdictional Plan during this update process and includes information on all 22 participating communities as well as Devens. Where applicable, text from the 2008 plan was used, although the report has been reorganized and updated to reflect newer data. Each section of this plan was reviewed, reorganized and updated as part of the 2014 update of the 2008 Hazard Mitigation Plan. This included updating the planning process, hazard identification, community assessments and evaluating and revising action items.

The purpose of this 2014 plan is to identify hazards within the Montachusett Region along with specific locations and vulnerability, and to establish a mitigation strategy to reduce risks. Addressing hazards before they occur is the best way to minimize impacts. This plan was created to achieve the following goal for the Montachusett Region: To reduce the loss of or damage to life, property, infrastructure, and natural and economic resources from natural disasters.

The preparation and implementation of this Natural Hazard Pre-Disaster Mitigation Plan will not only make funding sources available to implement the mitigation initiatives when eligible but also mitigation directly related to disaster recovery. This plan emphasizes actions to be taken now to reduce or prevent future disaster damages. This plan assists the community by developing policies and programs before a disaster occurs. If the actions identified in this plan are implemented, the damage that is left in the aftermath of future events can be minimized, thereby easing recovery and reducing the cost of repairs and reconstruction. This plan will also ease the receipt of post-disaster state and federal funding because the list of mitigation initiatives is already identified, reducing vulnerability to disasters by focusing limited financial resources to specifically identified needs, and connecting hazard mitigation planning to community and regional planning where possible.

Geographic Area

The geographic area of this Plan is the Montachusett Region. Montachusett is a region of 675 square miles located in north central Massachusetts due west of Boston.

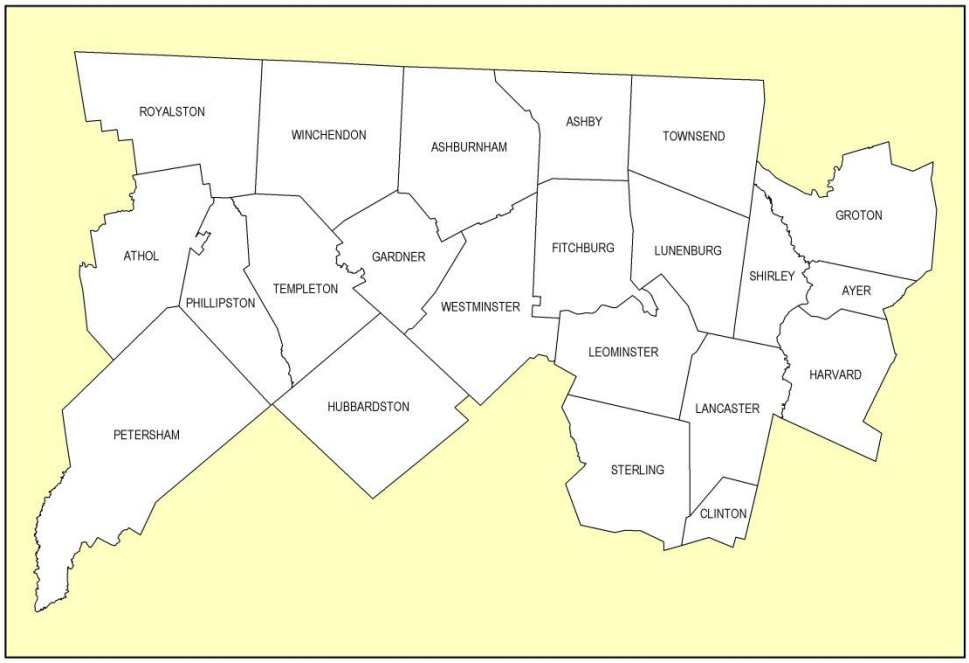


Figure 1 Communities Participating in the Plan

Twenty-two communities and Devens participated in the development of this plan (See Figure 1). Those communities are: Ashby, Ashburnham, Athol, Ayer, Clinton, Gardner, Fitchburg, Groton, Harvard, Hubbardston, Lancaster, Leominster, Lunenburg, Petersham, Phillipston, Royalston, Shirley, Sterling, Templeton, Townsend, Westminster and Winchendon.

The region is bordered by New Hampshire to the north, metropolitan Worcester to the south, former Franklin County to the west and metro Boston to the east. Most of the Region's topography consists of rolling, hilly terrain ranging from 1800 feet above sea level, on Mt. Watatic in Ashby, to 840 feet on Phillips Brook as it flows into the City of Fitchburg. The Region was formed over thousands of years of geologic activity and climate change. Alternating periods of volcanic activity, shifting faults and erosion led to the formation almost 600 million years ago, of the igneous and metamorphic rock that is characteristic of the terrain. One of the most important region-wide assets is its large quantity of open space. Large constructed lakes and natural bodies of water add to the Region's rural character. Both open pastures and steep, rock slopes characterize a great deal of the land.

Community Involvement

Each of the participating communities was involved in a number of ways. Each community was expected to attend at the initial regional meeting held on January 31st, 2012. In addition, a set of three meetings were held in each participating community. These community meetings were entirely open to the public – anyone with an interest was encouraged to attend/participate. The first two meetings were working meetings and attendees generally included emergency responders, planners, administrators and public works staff from the community. The third meeting was a public meeting at a Select Board or City Council meeting to go over the findings of the plan and solicit comments on the draft report. Some meetings were televised on the local communities' public access TV stations. A list of attendees and

meeting dates can be located in Appendix A.

2. Planning Process

The planning process was revised as part of the 2008 Hazard Mitigation Plan Update. The MRPC worked with the participating communities and coordinated the development of this plan. MRPC was established in 1968 to provide regional land use, transportation, and environmental planning expertise to the 22 communities that it now serves in the Montachusett Region. In its capacity as a regional planning agency, MRPC has conducted numerous detailed land use, transportation, and environmental planning studies.

At the commencement of the planning process, MRPC consulted with hazard mitigation staff from the Massachusetts Emergency Management Agency and the Massachusetts Department of Conservation and Recreation on the planning process. MRPC reviewed FEMA guidance on developing a plan and the regulations that guide the development of the plan.

MRPC began the process by convening a kick-off meeting with all participating communities. This event included a welcome and introduction, the State Perspective on Hazard Mitigation and Hazard Mitigation Planning (Sarah White, Acting MEMA Region 1 Manager and State Hazard Mitigation Planner), an Introduction to the Planning Process for the Hazard Mitigation Plan Five-Year Update by MRPC staff, followed by Questions and Answers from Local Emergency Management Directors, other interested officials and the general public.

Next, public meetings were held in each of the communities individually to discuss hazard mitigation and to solicit information on what hazards affect each community and to discuss and identify specific problem areas in to the community that need to be addressed within the plan addressing any newly identified hazards that have been determined to pose a threat. For example, wildfire risk has increased due to the December 2008 Ice Storm. This resulted in an update of the previously produced Hazard Maps based on updated hazard identification and assessment.

Follow-up meetings were then held in each community to discuss and update existing protection and mitigation measures and goals and objectives. As soon as two community meetings were held in each community, MRPC completed a draft of the report. MRPC staff then went back to each community and presented the findings and specific items related to the community at a Board of Selectmen or City Council meeting. Once all local meetings were held, comments were incorporated into the plan and sent to MEMA and FEMA for review.

Overall, the natural hazard mitigation planning process for the Montachusett Region included updating the identification of natural hazards that may impact all 22 communities, conducting a Vulnerability/Risk Assessment to identify the infrastructure (*i.e.*, critical facilities, public buildings, roads, homes, businesses, etc.) at the highest risk for being damaged by the identified natural hazards, identifying and assessing the policies, programs, and regulations the Montachusett Region's communities are currently implementing to protect against future disaster damages.

3. Regional Profile

Montachusett Region is comprised of three cities, 19 towns, and the unincorporated village of Devens. Montachusett is a region of 675 square miles located in north central Massachusetts with a population of 236,475 (2010 U.S. Census). The cities and towns that comprise the Region lie in "North Central Massachusetts" due west of Boston. While the region is mostly rural, well-defined industrial centers are present in the cities of Fitchburg, Leominster and Gardner and in the towns of Clinton, Ayer and Athol. Fitchburg and Leominster are the Region's most populous communities, and also make the largest contribution to the regional economy.

The region's topography is dotted by high peaks such as Mount Wachusett and Mount Watatic and other rolling hills typical of the New England landscape. Three watersheds namely the Chicopee River, Millers River and Nashua River, other streams, mountain paths, rail-trails, urbanized downtowns and neighborhoods, historic village centers and new housing subdivisions are connected by a local, state and interstate road system and a commuter and freight rail system linking Boston to Albany.

The area has been blessed to be able to experience four distinct seasons each year (summer, fall, winter and spring). Businesses and residents in the region can take full advantage of mountain biking, camping, canoeing, hiking, angling and picnicking in the summer, promoting tourist-related activities such as the sale of apples and pumpkins at local apple orchards in the fall, skiing, snowmobiling and ice-fishing in the winter and the re-start of outdoor activities in each succeeding spring.

Multiple land uses exists within the Montachusett Region including residential, mixed use (i.e. downtowns, central business districts and village centers), commercial, residential, non-permanently and permanently protected open space. Municipalities are making concerted efforts to preserve natural resources and open spaces while still fostering residential, commercial and industrial developments.

Population, Households and Employment

Population: The 2010 Census recorded 236,475 residents in the Region, a 3.7% increase in its population from the year 2000. Since 1960, the region's population as a whole has continued to grow. This trend can be seen below.

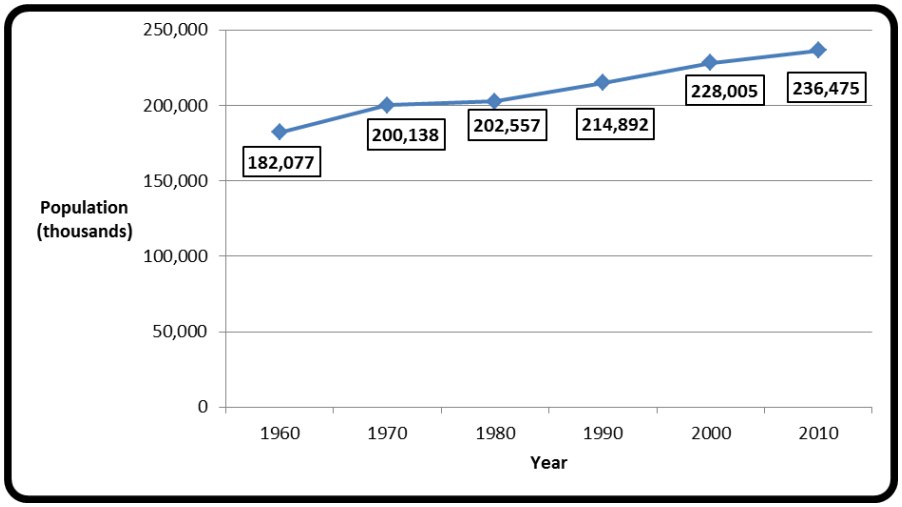


Table 1 below

indicates that while the region has been growing since 1990, most communities have seen population increases while some have seen significant growth. In fact, just three communities in region experienced a decrease in population between the years 2000 and 2010: Gardner, Townsend and Leominster. Communities that experienced the largest percentage increase in population since 2000 were Templeton (17.9%), Shirley (13.1%), Hubbardston (12.1%) and Groton (11.5%).

Table 1: Population in the Montachusett Region from 1990-2010

Community	Population			Change		% Change	
	1990	2000	2010	'90-'00	'00-'10	'90-'00	'00-'10
Ashburnham	5,433	5,546	6,081	113	535	2.1%	9.6%
Ashby	2,717	2,845	3,074	128	229	4.7%	8.0%
Athol	11,451	11,299	11,584	-152	285	-1.3%	2.5%
Ayer	6,837	7,287	7,427	450	140	6.6%	1.9%
Clinton	13,222	13,435	13,606	213	171	1.6%	1.3%
Fitchburg	41,194	39,102	40,318	-2,092	1,216	-5.1%	3.1%
Gardner	20,125	20,770	20,228	645	-542	3.2%	-2.6%
Groton	7,511	9,547	10,646	2,036	1,099	27.1%	11.5%
Harvard	4,448	5,981	6,520	1,533	539	34.5%	9.0%
Hubbardston	2,797	3,909	4,382	1,112	473	39.8%	12.1%
Lancaster	6,661	7,380	8,055	719	975	10.8%	9.1%
Leominster	38,145	41,303	40,759	3,158	-544	8.3%	-1.3%
Lunenburg	9,117	9,401	10,086	284	685	3.1%	7.3%
Petersham	1,131	1,180	1,234	49	54	4.3%	4.6%
Phillipston	1,485	1,621	1,682	136	61	9.2%	3.8%
Royalston	1,147	1,254	1,258	107	4	9.3%	0.03%
Shirley	5,739	6,373	7,211	634	838	11.0%	13.1%
Sterling	6,481	7,257	7,808	776	551	12.0%	7.6%
Templeton	6,438	6,799	8,013	361	1,214	5.6%	17.9%
Townsend	8,496	9,198	8,926	702	-272	8.3%	-3.0%
Westminster	6,191	6,907	7,277	716	370	11.6%	5.4%
Winchendon	8,805	9,611	10,300	806	689	9.2%	7.2%
TOTALS	215,571	228,005	236,475	12,434	7,470	5.8%	3.7%

Source: 1990, 2000 & 2010 U.S. Census

Housing: Table 2 below displays the number of dwelling units of each community in the region and the percent change from 1990 to the year 2000 and from 2000 to the year 2010. Since 2000, the Montachusett Region experienced a 9% increase in dwelling units, a significantly higher rate than from 1990 to 2000 (3.9%). Also, it should be noted that housing stock growth within the region outpaced population growth resulting in smaller households but this trend has most likely reversed since most housing growth probably took place from the years 2000 up until 2007 when the national recession began and has since slowed significantly.

Table 2: Housing Units

Community	Total Number of Housing Units			Percent Change	
	1990	2000	2010	1990-2000	2000-2010
Ashburnham	2,279	2,204	2,599	-3.30%	17.9%
Ashby	959	1,011	1,191	5.40%	17.8%
Athol	4,840	4,824	5,231	-0.30%	8.4%
Ayer	2,891	3,154	3,462	9.10%	9.8%
Clinton	5,635	5,844	6,397	3.70%	9.5%
Devens			152*		
Fitchburg	16,665	16,002	17,117	-4.00%	7.0%
Gardner	8,654	8,838	9,126	2.10%	3.3%
Groton	2,774	3,393	3,989	22.30%	17.6%
Harvard	3,141	2,225	2,047	-29.20%	-8.0
Hubbardston	1,025	1,360	1,662	32.70%	22.2%
Lancaster	2,095	2,141	2,614	2.20%	22.1%
Leominster	15,533	16,976	17,873	9.30%	5.3%
Lunenburg	3,486	3,668	4,133	5.20%	12.7%
Petersham	448	474	546	5.80%	15.2%
Phillipston	631	739	802	17.10%	8.5%
Royalston	469	526	574	12.20%	9.1%
Shirley	2,183	2,156	2,427	-1.20%	12.6%
Sterling	2,308	2,637	2,965	14.30%	12.4%
Templeton	2,276	2,597	3,139	14.10%	20.9%
Townsend	2,894	3,184	3,385	10.00%	6.3%
Westminster	2,405	2,694	2,960	12.00%	9.9%
Winchendon	3,349	3,660	4,199	9.30%	14.7%
Montachusett	**86,940**	**90,307**	**98,438**	**3.90%**	**9.0%**

Source: 1990, 2000 & 2010 U.S. Census

Table 3 that follows depicts Housing Occupancy Characteristics for the Montachusett Region. The rural communities of Ashby, Harvard, Hubbardston, and Phillipston had 90% or more of their occupied units were owner-occupied while the more urbanized communities of Ayer, Clinton, Fitchburg, Gardner, and Leominster had 40% or more renter occupied units.

Table 3: Housing Occupancy

Community	Owner Occupied Units		% Owner Occupied		Renter Occupied Units		% Renter Occupied	
	2000	2010	2000	2010	2000	2010	2000	2010
Ashburnham	1,714	1,928	88.9%	89.8%	215	220	11.1%	10.2%
Ashby	899	1,014	91.9%	91.8%	79	91	8.1%	8.2%
Athol	3,156	3,315	70.3%	71.2%	1,331	1,341	29.7%	28.8%
Ayer	1,661	1,861	55.7%	59.7%	1,321	1,257	44.3%	40.3%
Clinton	3,028	3,293	54.1%	56.5%	2,569	2,538	45.9%	43.5%
Fitchburg	7,708	8,191	51.6%	54.0%	7,235	6,974	48.4%	46.0%
Gardner	4,520	4,518	54.6%	54.9%	3,762	3,706	45.4%	45.1%
Groton	2,740	3,128	83.8%	83.3%	528	625	16.2%	16.7%
Harvard	1,638	1,730	90.5%	91.4%	171	163	9.5%	8.6%
Hubbardston	1,195	1,417	91.4%	90.5%	113	149	8.6%	9.5%
Lancaster	1,622	1,932	79.2%	80.2%	387	477	20.8%	19.8%
Leominster	9,545	9,830	57.9%	58.6%	6,946	6,937	42.1%	41.4%
Lunenburg	3,086	3,383	87.3%	88.2%	450	452	12.7%	11.8%
Petersham	362	428	82.6%	86.8%	76	65	17.4%	13.2%
Phillipston	527	582	90.9%	91.9%	53	51	9.1%	8.1%
Royalston	393	436	87.5%	87.6%	56	62	12.5%	12.4%
Shirley	1,467	1,669	70.5%	73.7%	610	595	29.5%	26.3%
Sterling	2,186	2,445	85.0%	87.0%	387	365	15.0%	13.0%
Templeton	1,996	2,393	82.8%	83.0%	415	489	17.2%	17.0%
Townsend	2,624	2,776	84.4%	85.7%	486	464	15.6%	14.3%
Westminster	2,169	2,342	85.8%	86.2%	360	374	14.2%	13.8%
Winchendon	2,492	2,755	72.3%	72.3%	955	1,055	27.7%	27.7%

Source: 2000 & 2010 U.S. Census

Employment: The region continues to undergo diversification of its economy. Following national and state trends, for decades, there is an ongoing trend in the reduction in the number of manufacturing jobs and an increase in jobs in the service sector. In addition, there have been local and regional efforts to boost tourism in the region. New types of manufacturing jobs are anticipated to be created in relation to markets yet to emerge and products related to electronics, biotechnology and nanotechnology. The types of service sector jobs that are growing are in the health care and hospitality sectors.

Table 4: Employment by Community and Sector

Community	AGR/ FOR/ FIS/ MIN	CONS	MFG	WS	RT	TRN/ WAR/ UTL	INFO	FIN/ INS/ RE	PRO, SCI, MGN/ WMS	EDU/ HLTH/ SS	ART/ ENT/ REC/ FDS	OTHR	PA	Total By Community
Ashburnham	15	278	461	85	231	79	67	319	347	883	255	92	241	**3353**
Ashby	37	121	201	94	215	91	17	51	153	479	106	63	86	**1714**
Athol	13	550	824	99	523	247	151	304	291	1375	315	132	178	**5002**
Ayer	30	196	420	53	318	146	190	181	548	836	278	172	295	**3663**
Clinton	27	384	1122	225	843	329	230	378	938	1457	466	364	538	**7301**
Devens	0	23	0	0	29	0	0	0	12	80	17	3	53	**217**
Fitchburg	55	1066	3096	360	2363	711	416	937	1664	4787	1845	684	714	**18698**
Gardner	28	529	1545	228	1059	148	76	448	611	2397	1110	304	457	**8940**
Groton	47	163	1030	182	406	38	135	459	1099	1146	298	210	150	**5363**
Harvard	9	133	426	56	139	44	123	171	527	726	51	121	87	**2613**
Hubbardston	20	198	430	47	250	33	90	98	203	575	117	86	109	**2256**
Lancaster	14	147	570	27	691	72	57	171	419	901	234	148	90	**3541**
Leominster	81	921	3295	584	2419	794	443	1233	1978	4897	1877	1148	1021	**20691**
Lunenburg	**37**	597	644	179	614	228	145	380	632	1281	298	326	242	**5603**
Petersham	34	49	54	3	29	24	14	19	90	187	49	13	34	**599**
Phillipston	25	95	158	32	124	49	20	21	47	242	50	33	107	**1003**
Royalston	6	60	98	19	57	9	6	15	52	141	42	13	51	**569**
Shirley	0	126	433	116	193	133	54	220	359	533	271	143	196	**2777**
Sterling	69	300	514	33	411	193	54	278	627	1017	212	216	241	**4165**
Templeton	17	241	518	43	394	298	79	222	314	998	151	200	356	**3831**
Townsend	61	354	846	145	599	161	72	158	505	1308	212	223	181	**4825**
Westminster	47	217	736	81	388	176	49	286	454	907	302	194	184	**4021**
Winchendon	96	206	991	159	553	177	66	279	371	1335	293	290	373	**5189**
Total	**768**	**6954**	**18412**	**2850**	**12848**	**4180**	**2554**	**6628**	**12241**	**28488**	**8849**	**5178**	**5984**	**115934**

Percentage Employed By Sector	**0.7%**	**6%**	**15.9%**	**2.5%**	**11.1%**	**3.6%**	**2.2%**	**5.7%**	**10.6%**	**24.6%**	**7.6%**	**4.7%**	**5.2%**

AGR	Agriculture	**FIS**	Fishing	**MIN**	Mining	**SCI**	Scientific
ART	Arts	**FOR**	Forestry	**OTHR**	Other	**SS**	Social Services
CONS	Construction	**HLTH**	Healthcare	**PA**	Public Administration	**TRN**	Transportation
EDU	Education	**INFO**	Information	**PRO**	Professional	**UTL**	Utilities
ENT	Entertainment	**INS**	Insurance	**RE**	Real Estate	**WAR**	Warehouse
FDS	Food Service	**MFG**	Manufacturing	**REC**	Recreation	**WMS**	Waste Management
FIN	Finance	**MGN**	Management	**RT**	Retail	**WS**	Wholesale

Source: American Community Survey 2008-2012

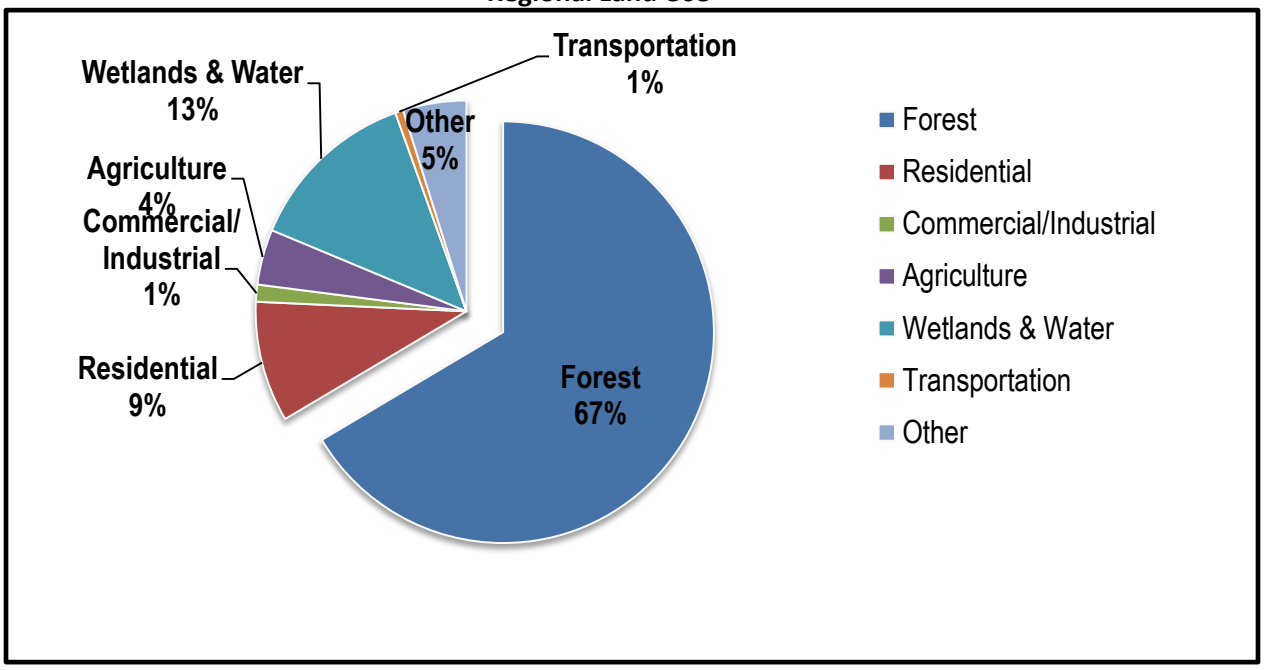
Table 4 above depicts the number of employed by Sector and Community. There are existing clusters of business in the region. While the area once benefited from furniture and paper manufacturing, these sectors have given way to the emerging polymers, plastics, metals fabrication and food processing facilities supported by a business services cluster (ex. finance, insurance and real estate). Education, healthcare, and social services account for the most jobs in the region, at 24.6%. The region is experiencing dramatic declines in manufacturing, an industry that has been so important to our region's history and economy, only accounting for 15.9% of all jobs in the Montachusett Region. In 1990, manufacturing jobs accounted for 29.4% of all jobs, and 24.4% in 2000. (1990 & 2000 U.S. Census)

The region is experiencing an increase in jobs in Finance, Insurance, and Real Estate (5.7%, up from 5.0% in 2000, and 4.5% in 1990). Agriculture, Forestry, Fishing and Mining accounted for the least amount of jobs in the region, coming in a just 0.7%, with Information at second-lowest, at 2.2%.

Regional Land Use

About 11% of the Montachusett Region is developed, primarily for residential purposes (9%) followed much further behind by Commercial/Industrial development (1%) and the transportation network (1%). Forested land makes up about 67% of the regions land use and 4% of the land is used for agricultural purposes. Wetlands and water bodies occupy about 13% of the region. Some of the densest areas of development are often situated along rivers where moving water was once used for various purposes for paper and textile mills and other factories. The chart below displays the land use in the Montachusett Region by percent and Table 5 depicts land use by each individual community.

Regional Land Use



Source: MassGIS, 2010

Table 5: Montachusett Region Land Use 2010

	Forest		Residential		Commercial &Industrial		Agricultural		Wetlands & Water		Transportation		Other		Total
Community	Acres	%	Acres	%	Acres	%	Acres	%	Acres	%	Acres	%	Acres	%	Acres
Ashburnham	19428	74.13%	1721	6.57%	53	0.20%	618	2.36%	3940	15.03%	7	0.03%	442	1.69%	26209
Ashby	12055	78.25%	1166	7.57%	35	0.23%	891	5.78%	916	5.94%	1	0.01%	342	2.22%	15406
Athol	16135	75.57%	1885	8.83%	258	1.21%	450	2.11%	1817	8.51%	126	0.59%	682	3.19%	21352
Ayer	2475	40.70%	846	13.92%	519	8.53%	133	2.18%	349	5.74%	951	15.64%	809	13.29%	6082
Clinton	1336	28.75%	246	5.28%	1225	26.36%	75	1.61%	80	1.72%	1106	23.80%	580	12.48%	4647
Fitchburg	10403	57.81%	3478	19.33%	930	5.17%	920	5.11%	587	3.26%	295	1.64%	1381	7.68%	17995
Gardner	8616	58.50%	2060	13.98%	484	3.29%	307	2.09%	2153	14.62%	166	1.12%	943	6.40%	14728
Groton	12421	57.46%	2975	13.76%	128	0.59%	1756	8.12%	3344	15.47%	9	0.04%	983	4.55%	21617
Harvard	9463	54.45%	1938	11.15%	200	1.15%	1489	8.57%	2443	14.06%	195	1.12%	1650	9.50%	17378
Hubbardston	20052	74.62%	1285	4.78%	107	0.40%	963	3.58%	3557	13.24%	33	0.12%	876	3.26%	26871
Lancaster	9331	52.10%	1541	8.60%	159	0.89%	1495	8.35%	2473	13.81%	223	1.25%	2688	15.01%	17910
Leominster	9835	51.78%	4338	22.84%	1123	5.92%	520	2.74%	1617	8.51%	253	1.33%	1309	6.89%	18994
Lunenburg	9996	56.29%	2794	15.73%	248	1.40%	1374	7.74%	2157	12.15%	42	0.24%	1147	6.46%	17758
Petersham	29984	68.65%	29	0.07%	622	1.42%	1011	2.31%	11473	26.27%	0	0.00%	556	1.27%	43675
Phillipston	12307	78.06%	510	3.24%	23	0.14%	284	1.80%	2368	15.02%	64	0.41%	210	1.33%	15766
Royalston	22386	82.22%	662	2.43%	20	0.07%	653	2.40%	3017	11.08%	15	0.06%	475	1.74%	27228
Shirley	6449	63.38%	1274	12.52%	101	0.99%	382	3.75%	1043	10.25%	43	0.43%	882	8.67%	10175
Sterling	11714	57.81%	2176	10.74%	248	1.23%	2204	10.88%	2410	11.89%	279	1.38%	1233	6.08%	20264
Templeton	13793	66.55%	1800	8.68%	219	1.06%	884	4.27%	2651	12.79%	313	1.51%	1065	5.14%	20724
Townsend	15763	74.69%	2085	9.88%	158	0.75%	828	3.92%	1573	7.45%	6	0.03%	692	3.28%	21104
Westminster	16700	70.04%	1781	7.47%	214	0.90%	752	3.15%	3083	12.93%	188	0.79%	1124	4.72%	23842
Winchendon	20452	72.44%	2399	8.50%	227	0.80%	632	2.24%	3312	11.73%	20	0.07%	1190	4.21%	28231
Source: (MassGIS, 2010)															

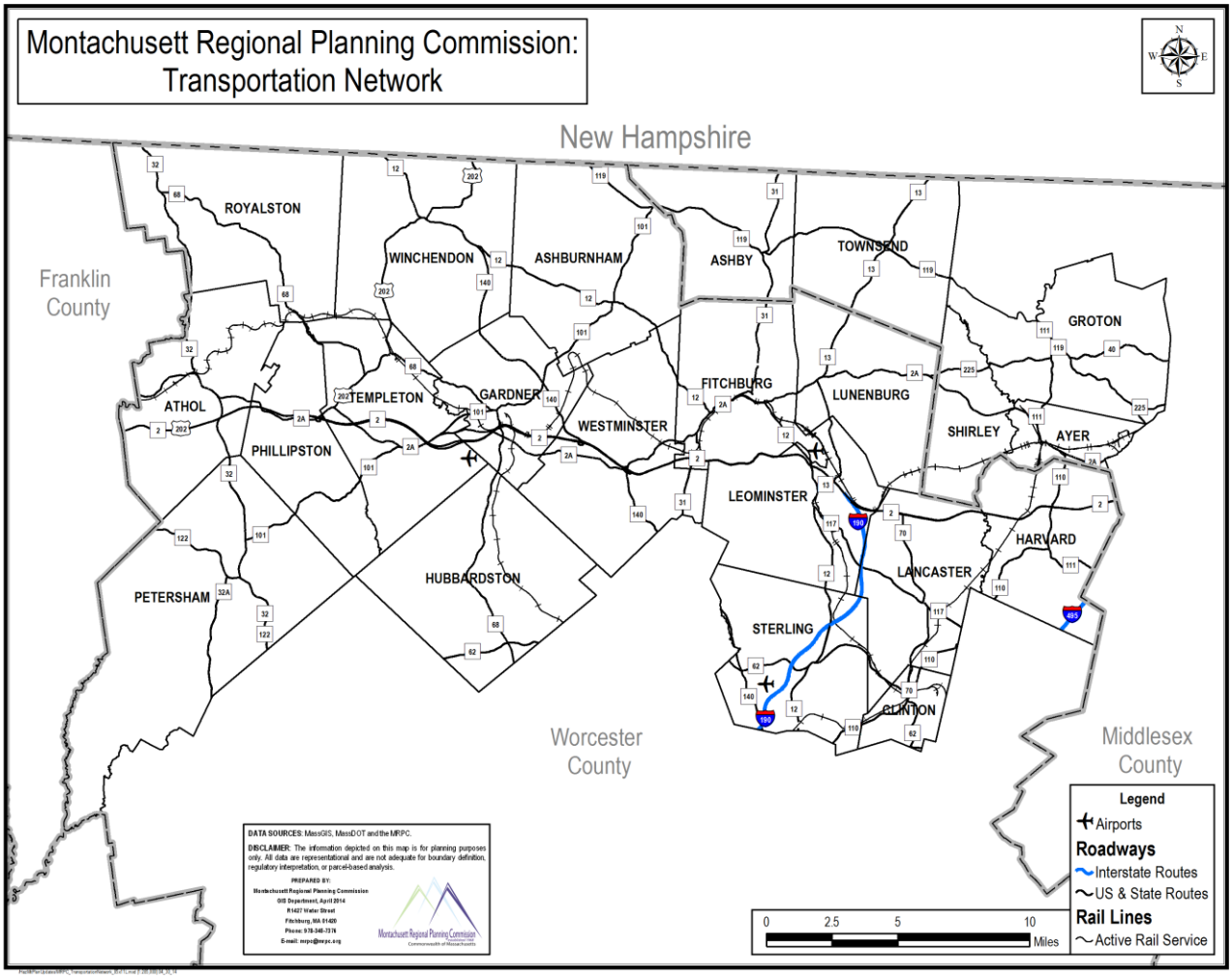
Transportation Network

Highways: The Montachusett Region is served by several state numbered routes that provide accessible links to all of the region's communities. Of greatest importance to the area is Route 2, running east-west throughout the entire region. This is one of two limited access east-west highways in the state and parallels the Massachusetts Turnpike in the center of the Commonwealth. This roadway provides the area with a direct link to I-495 and Boston in the east, and a connection in the west to I-91 and the western half of the state. Consequently, this highway is a major thoroughfare for the state as well as for the region. Additionally, in the time of an emergency Route 2 would function as a major evacuation route. The region's major urban communities, Fitchburg, Leominster and Gardner, all border Route 2. The section of Route 2 from Phillipston to Athol in the MRPC Region was part of an ongoing Safety Improvement Study, project and Task Force to improve the highway between Phillipston and Greenfield. Significant improvements in the two communities included construction of climbing lanes, on and off ramp improvements, a truck weigh station in Athol and the installation of an innovative centerline treatment called "Qwick Kurb" along approximately 13 miles of Route 2 in Phillipston and Athol.

The completion of I-190 in the early 1980's added a second major limited access highway to the region. This roadway provides direct access to Worcester, I-290 and the Massachusetts Turnpike. This highway has helped to reduce through traffic volumes on Route 12 by providing easier access to the Worcester area.

A second new limited access roadway was added to the region's highway network with the completion of the Route 140 Bypass in Gardner, Westminster and Winchendon. Also constructed in the early 1980's, as an alternative to the existing Route 140 layout, the Route 140 Bypass has enhanced traffic flow and alleviated some of the excess through traffic in Gardner City center. The MRPC and Central MA Regional Planning Commission (CMRPC) have worked with the communities of Sterling, Princeton, and Westminster on a Route 140 South Corridor Profile which has addressed safety concerns and made recommendations for improvements along the roadway from Route 2 south to I-190. A similar effort was undertaken by the MRPC along Route 140 North from Route 2 in Westminster north through Gardner and into Winchendon to Route 12. The Route 140 North Corridor Profile also identified potential improvements to address safety and access concerns in the three communities. Based upon information contained within this Corridor Profile, several safety improvements were implemented in Winchendon to Route 140 from the Gardner city line north to Teel Road.

The map below depicts the transportation network throughout the Montachusett Region.



Public Transportation: The Region receives a wide array of public transportation services. At the forefront of the region's public transportation is the Montachusett Regional Transit Authority (MART), which administers the local bus systems. MART offers fixed route, demand response and special employment transportation services to it's the communities of Fitchburg, Leominster and Gardner. Limited intercity bus services are also available in Winchendon, Templeton, Phillipston, Athol and Orange. A majority of communities have transportation service for the elderly and disabled.

The Massachusetts Bay Transportation Authority (MBTA), based in Boston provides commuter rail service to the reason. Four commuter rail stations are located in the Montachusett Region.

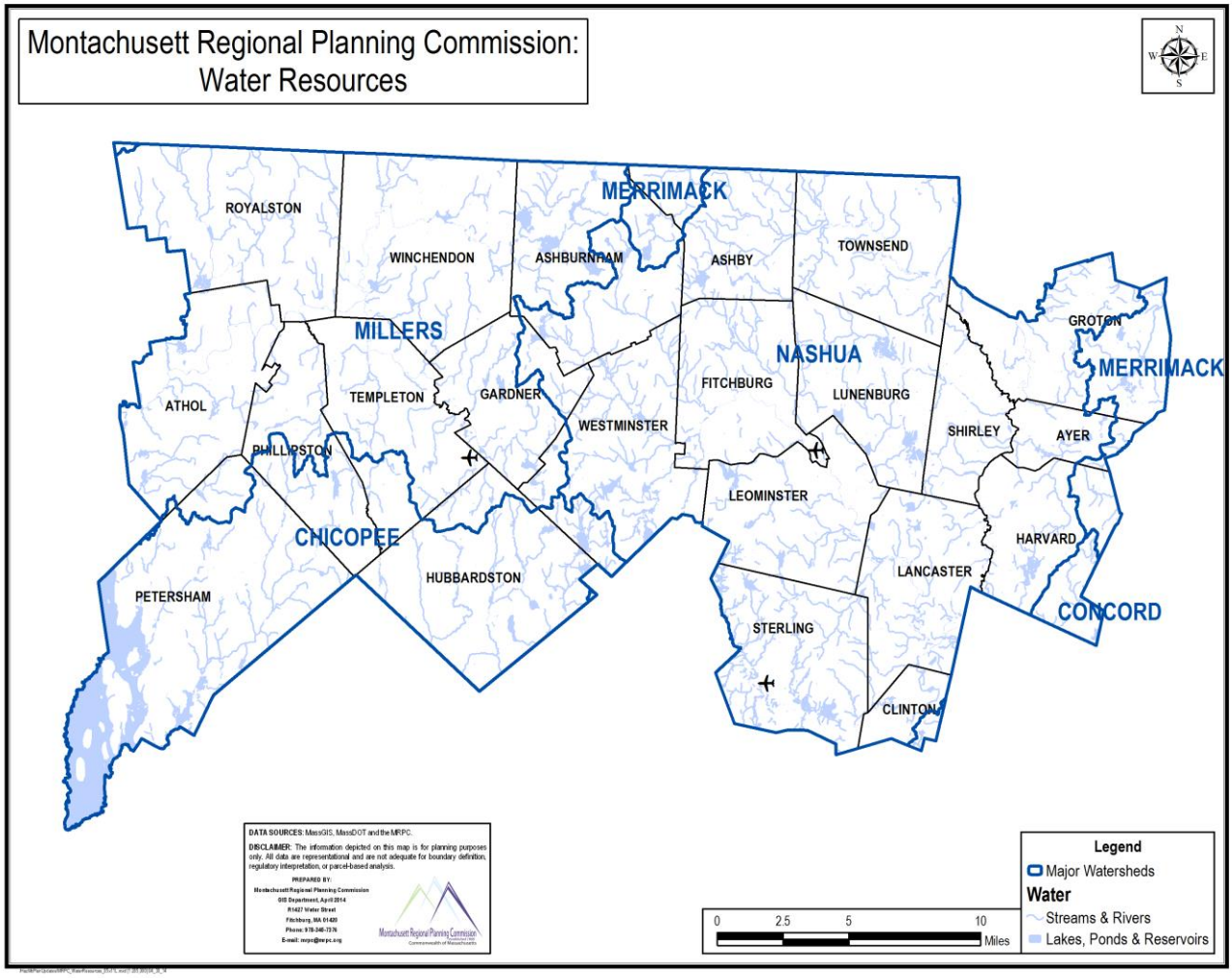
Air Transportation: Within the Montachusett Region, there are three general aviation airports. Fitchburg Municipal Airport is located between the cities of Fitchburg and Leominster and the Gardner Airport in Templeton is located near the Gardner City Line. Both are publicly owned. The third airport is Sterling Airport in Sterling which is owned by a private corporation. All three airports are open to the public. The largest of the airports by far is the Fitchburg Municipal Airport. The airport sits on 335 acres and is classified as a General Aviation, General Utility Stage II airport by the National Plan of Integrated Airport Systems (NPIAS). This indicates that the airport can serve all small airplanes and accommodate some larger aircraft with a wingspan of less than 79 feet. Averages of 170 flights per day are handled on its two-runway system.

Freight: Within the Montachusett Region, three major freight rail carriers operate, CSX Transportation,

Pan Am Railways and the Providence & Worcester Railroad. In the region track owned by each of the preceding rail operators combined total 148.7 miles.

Water Resources

The region encompasses parts of four watersheds in the Montachusett Region's communities, Millers, Nashua, Merrimack, and Chicopee. The majority of the region's communities are located in the Nashua River Watershed, followed by six communities in the Millers River Watershed, three in the Chicopee Watershed and a small portion of Ayer and Groton in the Merrimack River Watershed. All of these watersheds contain many smaller rivers and brooks, each with their own unique values, functions, and



uses.

The region contains 1,181 lakes and ponds totaling 22,678 acres. The region also has 4,277 wetlands, totaling 36,903 acres. The map below depicts water resources throughout the Montachusett Region.

4. Identification of Natural Hazards

As an update of the 2008 Regional Plan, all hazards were reviewed and updated based on the most recent data available.

Identifying and Profiling Hazards

This section outlines the natural hazards that affect the Montachusett Region documenting past occurrences. The natural hazards identified are based on the hazards found in the MA State Hazard Mitigation Plan. Throughout this section the natural hazards are discussed including past occurrences conditions contributing to the risk and future occurrences.

Flood Related Hazards

FLOODING

Flooding can be defined as a rising and overflowing of a body of water onto normally dry land. Floods can be slow or fast rising but generally develop over a period of days. A high percentage of impervious surfaces and high groundwater levels do not allow heavy rain to be absorbed back into the ground. Basement, roadway, and infrastructure flooding can result in significant damages due to poor or insufficient storm water drainage. This not only causes flooding but also prevents groundwater recharge and can threaten water quality, which can affect public drinking water supplies. Floods are among the most frequent and costly natural disasters in terms of human hardship and economic loss.

Previous Occurrences

There have been a number of significant flood events over time that have severely impacted the Montachusett Region including The Great Flood of 1936 when a combination of rainfall and liquid equivalent of melted snow during mid to late March ranged from 7 to 13 inches; The Great New England Hurricane of 1938 which was one of the most destructive and powerful storms ever to strike Southern New England causing a flooding catastrophe in the region, and; tropical storms Connie and Diane which occurred within a little over a week apart of each other in August 1955 producing significant flooding over much of Massachusetts.

Most recently, there was a major flood event in the Montachusett Region during mid to late March 2010 that was caused by a series of moderate to heavy rainfall events over a 5-week period which started in late February. The rainfall saturated soils, swelled rivers and streams, flooded basements, and caused road closures. The first major flood event in March occurred during the 13th to the 15th when 4 to 6 inches fell in parts of the Montachusett Region. The Nashua River experienced its worst flood in 23 years, resulting in substantial flooding in locations such as Lancaster and Clinton. Another significant rain event occurred March 22 to 23. This 1 to 3 inch rainfall event served to cause pockets of minor flooding, keeping soils saturated, and keeping river and streams elevated. The final big rain event in March 2010 occurred on the 29th to 31st of the month with rainfall totals ranging from 3 to 6 inches across central Massachusetts.

Conditions Contribution to Risk

The topography of the Montachusett Region is often characterized by rolling hills and valleys, with a significant amount of historic, high density residential/commercial/industrial development along sections of the Nashua and Millers Rivers. This development pattern led to substantial development within the floodplains in the communities of Fitchburg, Leominster, and Winchendon but significantly less development within the floodplains for higher terrain areas of the region. The map below illustrates the 100 year flood plain within the region and Table 6 lists the acreage of each community that is within the 100 year flood plan and how much of the flood plain is developed.

The 100-year flood, which is the standard used by most Federal and state agencies, is used by the National Flood Insurance Program (NFIP) as the standard for floodplain management and to determine the need for flood insurance. It should be noted that the term "100-year flood" is not the flood that will occur once every 100 years. Rather, it is the flood that has a one percent chance of being equaled or exceeded each year. For example, a structure located within the 100 year flood plain has a 26 percent chance of suffering flood damage during the term of a 30-year mortgage. Moreover, the 100-year flood could occur more than once in a relatively short period of time.

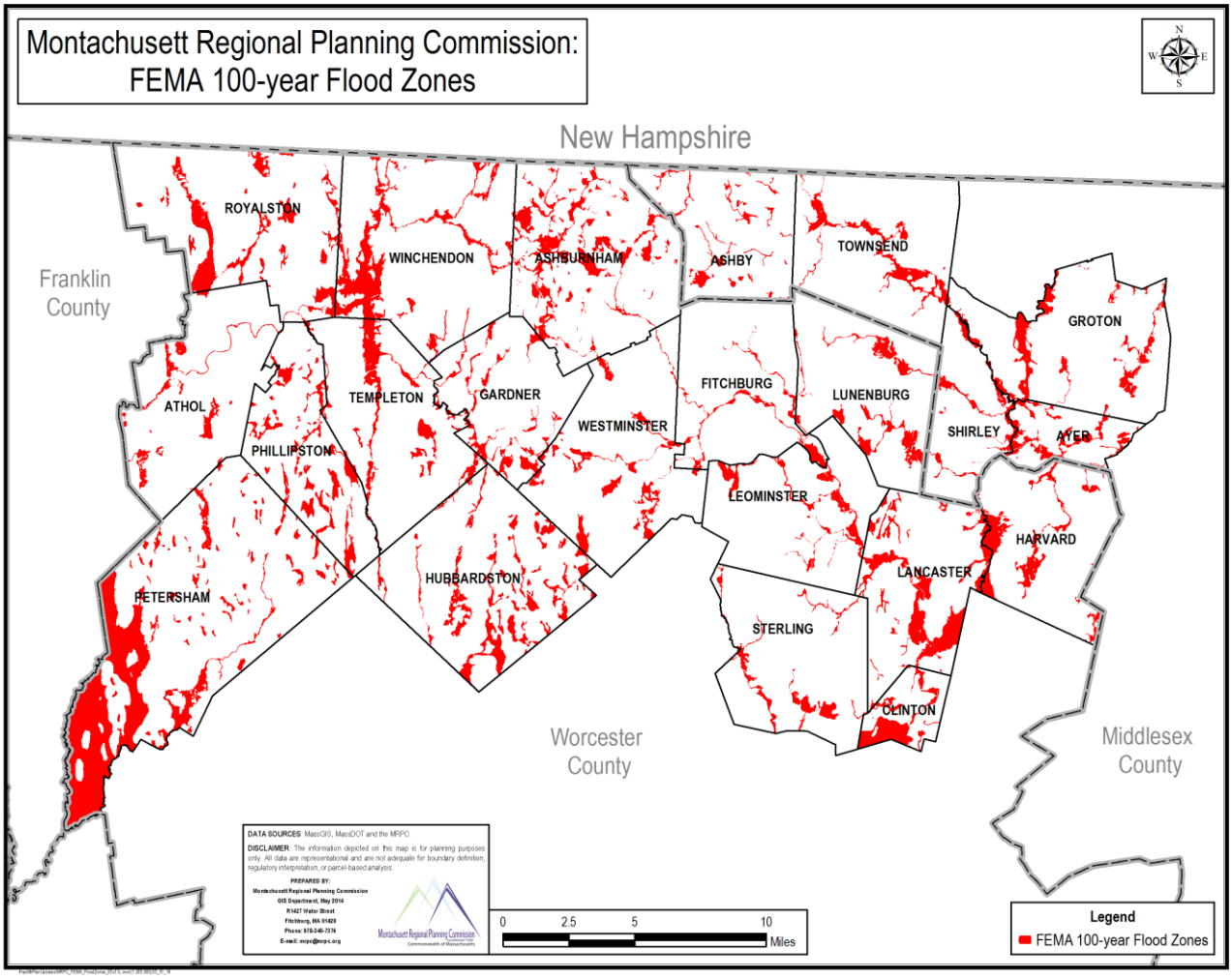


Table 6

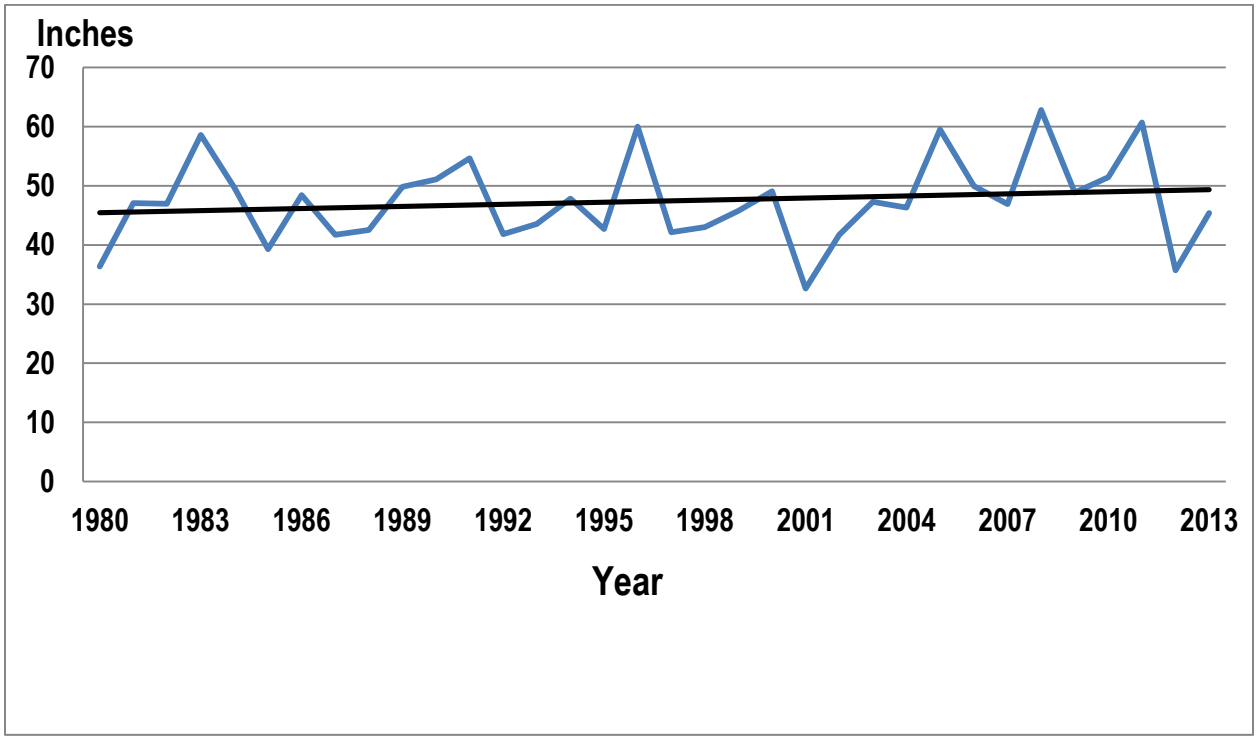
Acreage of Community within the 100 year Flood Plan And Flood Plain Development

Community	Acres in Community	Acres in 100-year Floodplain	Percent of Community in 100-year Floodplain	Acres of Floodplain that are developed	Percent of Floodplain Developed
Ashburnham	26,208.81	3434.38	13.10%	65.54	1.91%
Ashby	15,406.70	911.63	5.92%	12.09	1.33%
Athol	21,352.00	1299.58	6.09%	65.77	5.06%
Ayer	6,082.06	1175.61	19.33%	82.32	7.00%
Clinton	4,646.91	1358.09	29.23%	58.93	4.34%
Fitchburg	17,994.55	876.54	4.87%	344.03	39.25%
Gardner	14,728.23	1421.90	9.65%	37.75	2.66%
Groton	21,616.56	2178.62	10.08%	53.91	2.47%
Harvard	17,378.23	2022.04	11.64%	12.43	0.61%
Hubbardston	26,870.78	3365.78	12.53%	18.51	0.55%
Lancaster	17,909.52	3246.78	18.13%	87.35	2.69%
Leominster	18,993.98	1260.39	6.64%	230.33	18.27%
Lunenburg	17,757.70	1617.79	9.11%	69.13	4.27%
Petersham	43,675.44	11204.06	25.65%	8.64	0.08%
Phillipston	15,766.16	2277.68	14.45%	10.70	0.47%
Royalston	27,229.17	3104.81	11.40%	32.84	1.06%
Shirley	10,175.24	980.09	9.63%	35.08	3.58%
Sterling	20,263.95	1135.56	5.60%	33.08	2.91%
Templeton	20,723.60	2300.54	11.10%	41.92	1.82%
Townsend	21,103.98	1575.41	7.46%	77.87	4.94%
Westminster	23,842.46	1769.54	7.42%	33.75	1.91%
Winchendon	28,230.54	3670.45	13.00%	122.41	3.34%

Source: FEMA/MassGIS 2013

Based on data gathered from the National Climatic Data Center, the yearly precipitation total for the Montachusett Region has been experiencing a gradual rise over the last 33 years. This can be seen in the chart below. In fact, two of the years since 1980 with the highest inches of rainfall have occurred most recently; 2008 (63") and 2011 (61").

Montachusett Region
Historic Rainfall (Yearly Total)



Source: NOAA, 2013

Future Occurrences

Using the past as a guide, the Montachusett Region will continue to be impacted by floods. Moreover, the increase in yearly precipitation the region is experiencing as well as the amount of development that is within the floodplain, we are likely to see increased amounts of flooding and damage. Efforts to flood proof or relocate existing development within the floodplain, along with efforts to prohibit or limit new development, will decrease the potential for damage and losses in the future.

BRIDGES

According to data from the Massachusetts Department of Transportation (MassDOT), the Montachusett Region has 30 bridges that cross water bodies that are listed as structurally deficient, as shown in Table 7 below. These bridges pose a greater risk for failure during a flooding event.

Typically, bridges with an AASHTO (American Association of State Highway and Transportation Officials) rating below 50 are considered structurally deficient. However some bridges may be considered structurally deficient due to deterioration to one or more of its major components. Seven of the bridges listed in the Table below are in the design status as part of MassDOT's current bridge program.

Table 7: Structurally Deficient Bridges in the Montachusett Region

Community	Roadway	Over	Owner	Year Built/ Rebuilt	AASHTO Rating	Status
Ashby	Turnpike Road	Trapfall Brook	Town	1940/ 1993	51.9	Preliminary Design
Athol	Chestnut Hill Avenue (Rt. 32)	Millers River	Town	1850/ 1921	6.2	
Athol	Crescent Street	Millers River	Town	1937	5.0	
Athol	Exchange Street	Millers River	Town	1939/ 1988	50.5	
Athol	Washington Avenue	South Athol Pond Outlet	Town	1940	49.4	
Athol	Pinedale Avenue	East Branch Tully River	Town	1937	21.8	
Athol	(Rt. 2A)South Main Street	West Brook	MassDOT	1930	68.6	
Fitchburg	Route 2	Wyman Brook	MassDOT	1947	62.6	
Fitchburg	Westminster Road (Rt. 31)	Phillips Brook	MassDOT	1947	60.1	Preliminary Design
Fitchburg	River Street (Rt. 31)	North Nashua River	MassDOT	1947	18.4	Preliminary Design
Gardner	West Street (Rt. 68)	Bailey Brook	MassDOT	1939	71.1	
Gardner	West Broadway (Rt. 2A)	Bent Travers Pond	MassDOT	1924/ 1929	68.9	
Hubbardston	Burnshirt Road	Burnshirt River	Town	1940	62.5	
Hubbardston	Old Boston Turnpike (Rt. 62)	West Branch Ware River	Town	1950	34.7	
Hubbardston	Evergreen Road	Mason Brook	Town	1920/ 1938	43.4	
Leominster	Whitney Street	Monoosnoc Brook	City	1913	26.7	
Petersham	Glen Valley Road	East Branch Swift River	Town	1940/ 1976	18.9	
Royalston	North Fitzwilliam Road	Lawrence Brook	Town	1959	69.0	
Royalston	Northeast Fitzwilliam Road	Lawrence Brook	Town	1936	21.5	
Royalston	Stockwell Road	Lawrence Brook	Town	1939/ 1985	18.5	
Templeton	North Main Street	East Templeton Pond Outlet	Town	1938	45.4	

Townsend	Canal Street	Squannacook River	Town	1850/ 1976	48.3	
Townsend	Main Street (Rt.119)	Pearl Hill Brook	MassDOT	1907/ 1931	56.2	
Westminster	Ashburnham Street (Rt. 12)	Phillips Brook	MassDOT	1926	4.0	25% Design
Westminster	Whitmanville Road	Whitman River	Town	1937	39.2	
Winchendon	Maple Street (Rt. 202)	North Branch Millers River	MassDOT	1937	38.3	
Winchendon	River Street (Rt. 202)	Millers River	MassDOT	1932	49.6	Preliminary Design
Winchendon	High Street	Millers River	Town	1850/ 1973	47.7	
Winchendon	Harris Road	Tarbell Brook	Town	1940	49.0	Preliminary Design
Winchendon	North Royalston Road	West Branch Millers River	Town	1850/ 1980	41.8	Preliminary Design

Source: MASSDOT 2012 Bridge Inventory

DAM FAILURE

Previous Occurrences

Historically, dam failure has had a low occurrence in the Montachusett Region. However, many of the dams within the region are more than 100 years, and some are even older leaving the possibility of dam failure intact.

Conditions Contributing to Risk

Massachusetts Department of Conservation and Recreation Office of Dam Safety maintains an inventory of all dams in the State. The MRPC is unable to obtain an updated database from DCR for this plan regarding condition, (whether good, fair or poor) of dams in our region. The hazard potential of dams in the region is documented in Table 8. A more detailed breakdown of the hazard potential of dams by city/town is located in the community annexes of this report. Classifications for potential hazards are in accordance with the chart below.

Table 8: Hazard Potential Classification

High Hazard	Refers to dams located where failure will likely cause loss of life and serious damage to home(s), industrial or commercial facilities, important public utilities, main highway(s) or railroad(s).
Significant Hazard	Refers to dams located where failure may cause loss of life and damage home(s), industrial or commercial facilities, secondary highway(s) or railroad(s) or cause interruption of use or service of relatively important facilities
Low Hazard	Refers to dams located where failure may cause minimal property damage to others. Loss of life is not expected.

Source: MA Department of Conservation and Recreation Office of Dam Safety

High hazard dams must be inspected every two year, significant hazard every five years, and low Hazards dams every 10 years. Owners of dams are responsible for having their dam inspected. MGL Chapter 253 and 302 CMR 10.00 requires that dam owners prepare, maintain and update Emergency Action Plans for all High Hazard Potential dams and certain Significant Hazard Potential dams.

Non-jurisdictional dams are not regulated by the Office of Dam Safety or under their jurisdiction. Typically these dams are under 6 feet in height and/or under 15 acre-feet in storage and do not have an assigned 'Hazard Code'. Dams owned and regulated by the Federal Government are also typically non-jurisdictional but DO have an assigned Hazard Code.

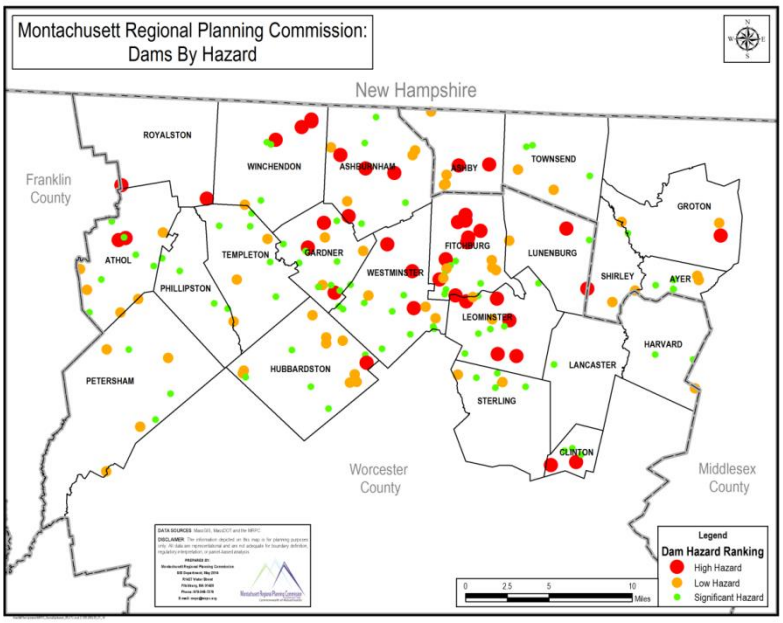
There are 290 Dams in the Montachusett Region. Forty-five (45) are considered high hazard, 76 are of significant hazards and 54 are of low hazard. The remaining dams are non-jurisdictional.

Table 9: Dams in the Montachusett Region and Hazard Potential

Community	High Hazard	Significant Hazard	Low Hazard	Non-Jurisdictional*	Total # of Dams
Ashburnham	4	4	4	12	24
Ashby	2	0	4	1	7
Athol	2	6	4	8	20
Ayer	0	4	3	2	9
Clinton	2	3	0	1	6
Fitchburg	9	6	5	11	31
Gardner	3	8	3	7	21
Groton	1	1	2	0	4
Harvard	0	2	1	8	11
Hubbardston	1	5	9	6	21
Lancaster	1	0	0	5	6
Leominster	6	6	2	7	21
Lunenburg	2	1	1	5	9
Petersham	0	3	4	4	11
Phillipston	0	4	1	5	10

Royalston	2	0	0	2	4
Shirley	0	0	1	1	2
Sterling	0	5	2	14	21
Templeton	0	5	2	5	12
Townsend	0	3	2	2	7
Westminster	3	10	3	4	20
Winchendon	4	3	1	5	13
Total	45	76	54	115	290

*** Source: 2012 Department of Conservation and Recreation Office of Dam Safety**



Future Occurrences

Future occurrences of dam failure are a realistic possibility. Based upon the conditions shown in above map, 38 dams in the Montachusett Region are a high hazard. It should be noted that this that this number could be higher as many dams are non-jurisdictional, thus they are not inspected by the Office of Dam Safety. Non-jurisdictional dams are defined as being less than 6 feet high and store less than 15 acre-feet of water.

ICE JAMS

Ice jams occur in the winter or early spring when normally flowing water begins to freeze. There are two types of ice jams; a freeze up and a breakup jam. A freeze up jam forms in the early winter as ice formation begins. This type of jam can act as a dam and begin to back up the flowing water behind it. The second type, a break up jam forms as a result of the breakup of ice cover, causing large pieces of ice to move downstream potentially acting as a dam, impacting culverts and bridge abutments.

Previous Occurrences

There have been a reported 35 ice jams that have occurred in the Montachusett Region between 1913

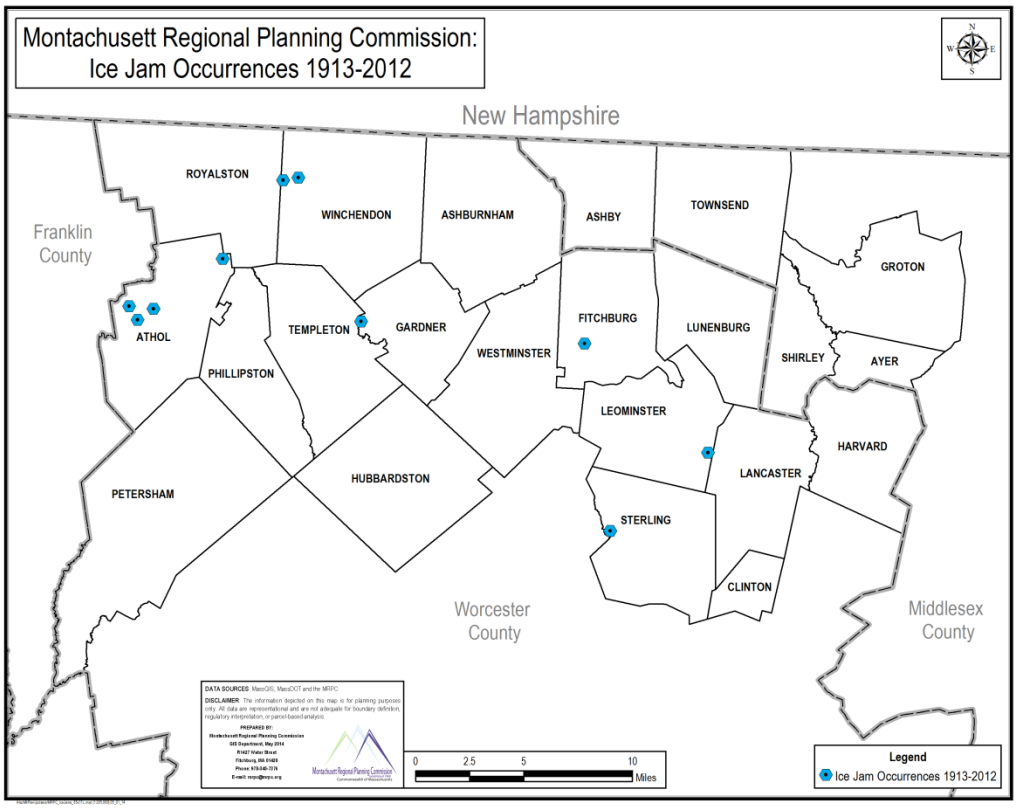
and 2012. The Millers River has been problematic and accounts for 20 of these jams within the communities of Athol (6), South Royalston (12), and Winchendon (2). Priest Brook in Winchendon accounts for 5 ice jams and in the years 1951, 1953, 1964, and 1965 Rocky Brook in Sterling accounted for a total of 4 ice jams. One other ice jam occurred in Otter River in the year 1965 and the Nashua River accounts for a total of 2 ice jams one of which occurred in Westminster and the other in North Leominster.

Table 10: Ice Jams in the Montachusett Region

Community	River	Date
Athol	Millers River	2/13/2008
Athol	Millers River	12/15/2005
Athol	Millers River	1/24/2005
Athol	Millers River	1/17/2004
Westminster	Nashua River	1/24/1999
Athol	Millers River	1/1/1996
South Royalston	Millers River	1/10/1973
South Royalston	Millers River	1/24/1971
Otter River	Otter River	2/4/1970
Winchendon	Millers River	2/4/1970
South Royalston	Millers River	1/15/1970
South Royalston	Millers River	1/3/1969
Winchendon	Priest Brook	3/19/1968
Sterling	Rocky Brook	2/25/1965
Otter River	Otter River	2/11/1965
South Royalston	Millers River	1/23/1964
Sterling	Rocky Brook	1/21/1964
South Royalston	Millers River	2/26/1961
Leominster	North Nashua River	12/12/1960
Sterling	Rocky Brook	3/31/1960
Winchendon	Priest Brook	4/3/1959
South Royalston	Millers River	1/24/1959
South Royalston	Millers River	2/20/1958
South Royalston	Millers River	1/24/1957
Sterling	Rocky Brook	2/2/1953
South Royalston	Millers River	12/21/1951
Winchendon	Priest Brook	2/9/1951
Sterling	Rocky Brook	2/7/1951
Leominster	North Nashua River	1/6/1949
South Royalston	Millers River	1/9/1943
South Royalston	Millers River	2/11/1941
Winchendon	Priest Brook	4/2/1940

Winchendon	Millers River	1/25/1938
Winchendon	Priest Brook	12/26/1937
Athol	Millers River	3/12/1936

Source: U.S. Army Corps of Engineers



Conditions Contributing To Risks

Heavy snow fall and frigid temperatures throughout the Northeast increase the chance of flooding from snowmelt and ice jams. When river ice piles up at shallow areas, bends and islands it blocks the flow of water and may cause flooding of nearby homes and businesses. Ice jams that become lodged within the abutment of bridges can threaten the integrity of the structures. Heavy equipment, such as cranes with wrecking balls and explosives may have to be used to break up ice jams to reduce potential property and structural damages and losses.

Future Occurrences

With the climatic conditions that occur in the Montachusett Region, ice jams will continue into the future causing damage to bridges and roads and buildings within the floodplain. To minimize ice jams, special consideration should be made during reconstruction of any bridges or dams which tend to be where ice jams are more likely to occur.

Coastal Storms

Coastal storms have not been addressed in this plan since the Montachusett Region does not have any coast line and is over 30 miles from the nearest coast.

Atmospheric Related and Winter Related Hazards

HURRICANES/TROPICAL STORMS

Hurricanes can occur along the East Coast of the United States anytime in the period between June and November. Hurricane intensity and the potential property damage posed by a hurricane are rated from 1 to 5 according the Saffir-Simpson Hurricane Scale (see Table 11 below).

Table 11: Saffir-Simpson Hurricane Scale

Category	Wind Speed
Tropical Storm	39–73 mph (63–117 km/h)
1	74–95 mph (119–153 km/h)
2	96–110 mph (154–177 km/h)
3	111–130 mph (178–209 km/h)
4	131–155 mph (210–249 km/h)
5	≥156 mph (≥250 km/h)

***Source 2014 - National Weather Service, National Hurricane Center**

Previous Occurrences

The National Oceanic and Atmospheric Administration (NOAA) has been keeping records of hurricanes since 1858 – see Table 12. From 1858 to 2013, the Montachusett Region has had one Tropical Depression, seven Tropical Storms, one Category 1 Hurricane, and two Category 2 Hurricanes pass directly through the Region. The map that follows displays the historic tracks of hurricanes across the region.

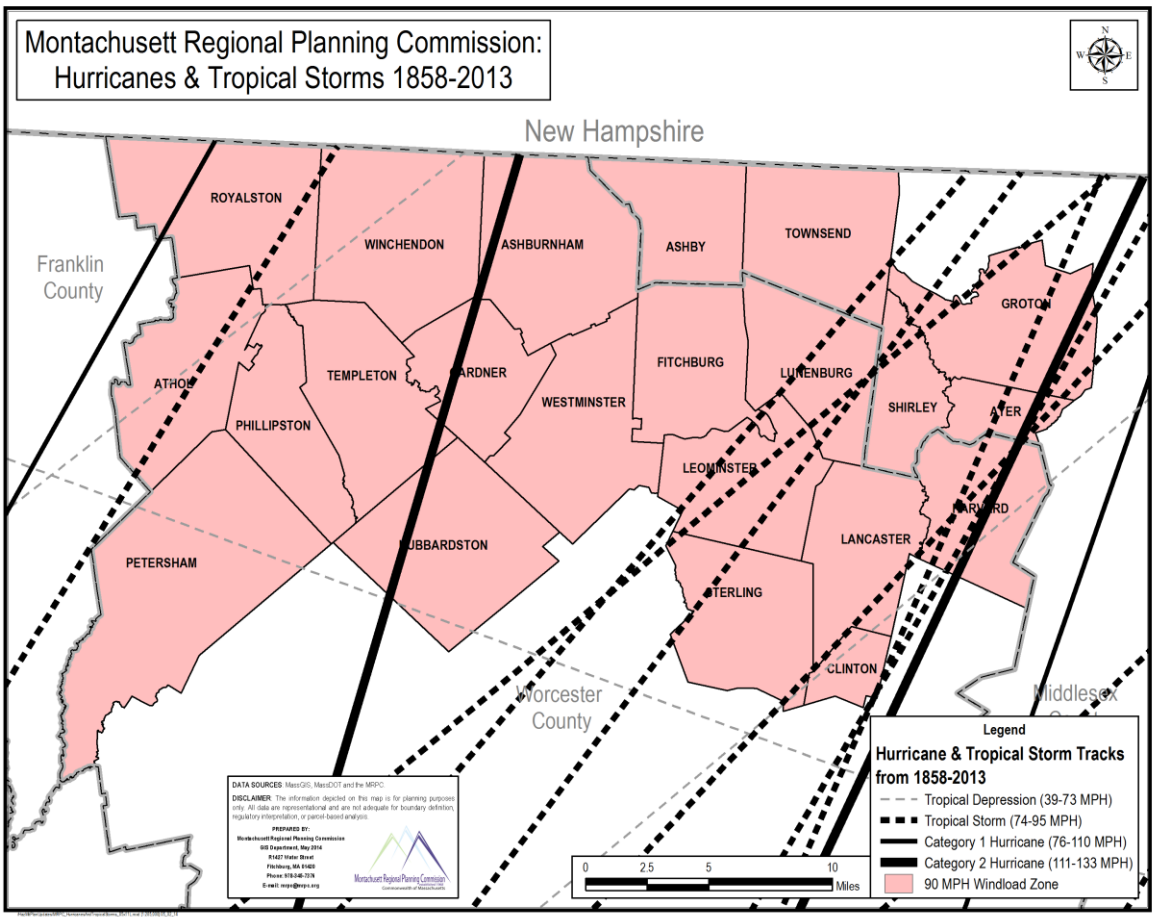


Table 12: Hurricanes and Tropical Storms which passed directly through the Montachusett Region (1858 – 2013)

Date	Type	Name	Wind Speed
9/28/1861	Tropical Storm	Unnamed	50
9/30/1874	Tropical Storm	Unnamed	60
10/10/1894	Tropical Storm	Unnamed	55
9/2/1952	Tropical Depression	Able	30
8/31/1954	Category 2	Carol	85
7/30/1960	Tropical Storm	Brenda	45
9/12/1960	Category 2	Donna	90
9/15/1961	Tropical Storm	Unnamed	35
9/27/1985	Category 1	Gloria	75
9/17/1999	Tropical Storm	Floyd	50
9/17/2004	Tropical Storm	Charley	50

Source: National Oceanic and Atmospheric Administration 2013

The effects of hurricanes and tropical storms are often felt much farther away from the direct path. From 1858 to 2013, an additional 44 hurricanes/tropical storms have passed within 100 miles of the Montachusett Region – see Table below. Table 13 also indicates that hurricanes and tropical storms are

generally limited to the months of July, August, and September within one hundred miles of the Montachusett Region although there has been an occurrence in May and November.

Table 13: Hurricanes and Tropical Storms within 100 miles of the Montachusett Region

Month	# of Storms
May	1
June	0
July	3
August	6
September	27
October	6
November	1
Total	**44**

Source: National Oceanic and Atmospheric Administration 2013

Of all the natural threats that might affect the Montachusett Region, hurricanes such as the one in 1938, have the potential to cause the most property damage and loss of life if adequate planning and preparation is not undertaken. The 1938 Hurricane had winds of over 120 miles per hour that blew across the coastal regions. While the coastal communities of southeastern Massachusetts generally take the brunt of hurricanes, flooding and winds also affect the inland areas including the Montachusett Region. The sustained rains of the storm contribute to river flooding, and high winds cause widespread power outages and property damage.

Conditions Contributing to Risks

According to NOAA, tropical storm season lasts from June 1 to November 30, and an average of 10 tropical storms develop along the eastern seaboard each year. On average, five of these 10 become hurricanes capable of traveling northward towards New England which exposes the Montachusett Region to the risk of high winds and heavy rainfall.

Future Occurrences

Based upon past storm events and the geographic location of the Montachusett Region, the area will continue to be impacted by tropical storms and hurricanes. Moreover, it is speculated by many that future occurrences have the potential to be more severe with climate change.

TORNADOS

A tornado is a violent windstorm characterized by a twisting, funnel-shaped cloud with whirling winds of up to 300 miles per hour. These events are spawned by thunderstorms and occasionally by hurricanes, and may occur singularly or in groups. Tornadoes can occur at any time of the year, although they are rare outside of the warm season. The peak months of "Tornado Season" occurs in the Northeast from May through September, with August being the month of greatest tornado frequency. Most tornadoes are likely to occur during the mid-afternoon and evening hours (3-6PM). However, they can occur at any time, often with little or no warning.

Previous Occurrences

The National Climatic Data Center reports data on tornado events, and does so as far back as 1950. Worcester County has been an area of the state where a majority of significant tornadoes in Massachusetts have occurred. Since 1950, there have been 14 tornados in the Montachusett Region, the most recent of which occurred in 1990. Tornados are rated based on the Fujita Tornado Scale as shown on Table 14 below.

Table 14: Fujita Tornado Damage Scale

F-SCALE NUMBER	INTENSITY PHRASE	WIND SPEED	DAMAGE
F0	Gale tornado	< 73 mph	Light Damage- Some damage to chimneys; branches broken off trees; shallow-rooted trees pushed over; sign boards damaged.
F1	Moderate tornado	73-112 mph	Moderate Damage- Peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos blown off roads.
F2	Significant tornado	113-157 mph	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	Severe tornado	158-206 mph	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	Devastating tornado	207-260 mph	Devastating Damage- Well-constructed houses leveled; structures with weak foundations blown away some distance; cars thrown and large missiles generated.
F5	Incredible tornado	261-318 mph	Incredible Damage- Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 100 meters (109 yds.); trees debarked; incredible phenomena will occur.

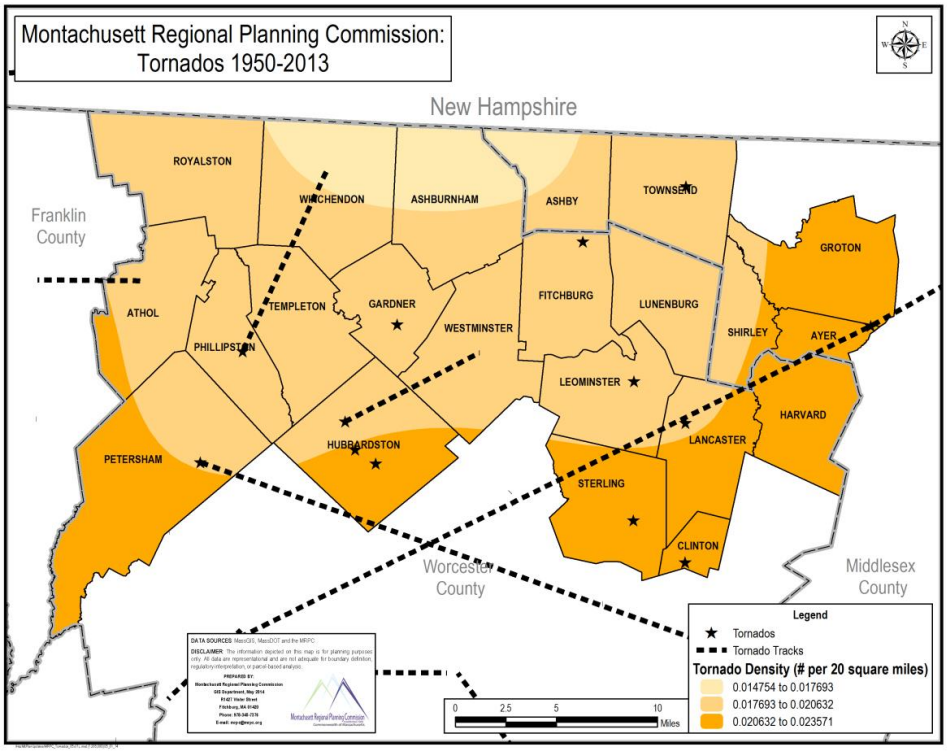
Source: The National Oceanic & Atmospheric Administration

Of the 14 tornados that have occurred in the region, one (1) was rated as F0 on the Fujita Tornado scale, seven (7) were F1, four (4) were F2, and one (1) was F3. The most devastating tornado ever to occur in New England was an F4 that occurred on July 9, 1953. It first touched down in Petersham, and then traveled on a 46-mile southeast path through Barre, Rutland and Holden, across Worcester into Shrewsbury, Westborough and Southborough. Within a matter of minutes, more than 90 people were dead, and over 1,300 injured and fifteen thousand were left homeless.

Table 15: Tornados: 1950 - 2013

Date	Community	Property Damage	Category	Deaths/Injuries
6/9/1953	Petersham	$50M-$500M	F4	90/1228
6/1/1956	Fitchburg	$5K-$50K	F1	0/14
11/21/1956	Clinton	$500K-$5M	F2	0
6/19/1957	Lancaster	$5K-$50K	F1	0
7/5/1957	Leominster	$500-$5000	F2	0
5/20/1963	Clinton	$5K-$50K	F2	0
7/11/1970	Townsend	$5K-$50K	F1	0
7/1/1971	Ayer	$5K-$50K	F1	0/1
11/7/1971	Hubbardston	$500-$5000	F1	0
8/9/1972	Phillipston	$5K-$50K	F2	0/1
6/22/1981	Hubbardston	$5K-$50K	F3	0/3
7/10/1989	Hubbardston	$50K-$500K	F1	0
7/10/1989	Sterling	$50K-$500K	F1	0
8/10/1990	Gardner	<$50	F0	0
Total				**90/1247**

Source: The National Oceanic & Atmospheric Administration 2013



Tornadoes generally occur during the summer months, however, as can be seen in the table below, tornados have occurred as early as May and as late as November.

Table 16. Tornados by Month in the Montachusett Region

Month	Count
May	1
June	4
July	5
August	2
November	2

Source: The National Oceanic & Atmospheric Administration 2013

Conditions Contributing to Risk

The Montachusett Region has experienced several Tornado occurrences between 1950 and 2013 indicating that the region has good potential in terms of spawning tornados. In fact, Worcester County has been an area of the state where a majority of significant tornadoes in Massachusetts have occurred.

Future Occurrences

From 1950 to 2013 there has been, on average, one tornado every 4.5 years. With 7 of the 14 tornados being classified as a relatively weak F0 or F1 tornado, the remaining 7 tornados are classified as major F2 or higher tornados and can be expected approximately every 9 years.

SEVERE THUNDERSTORMS/HIGH WINDS/HAIL

Massachusetts is regularly susceptible to flooding from severe rainstorms and thunderstorms throughout the warmer months. A thunderstorm is a rain shower during which you hear thunder. Since thunder comes from lightning, all thunderstorms have lightning. According to National Oceanic and Atmospheric Administration, a thunderstorm is classified as "severe" when it contains one or more of the following: hail three-quarter inch or greater, winds gusting in excess of 50 knots (57.5 mph), and/or tornadoes.

Past Occurrences

The table below indicates that from 1996 to 2013 there were 137 severe storms in the Montachusett Region that were comprised of thunderstorms, wind, or hail which averages 7.61 storms per year. Examining the thunderstorms and high winds separately from the hail indicates that the Montachusett Region received 83 thunderstorms and high wind events over the 18 year period, or 4.61 per year and 54 hail events over the same period, or 3 events per year.

Table 18 also indicates that Thunderstorms and Winds occurred in January, May, June, July, August,

September, and October. However, the majority of storms occurred between May and August with June being the highest month. Hail has occurred in March, May, June, July, August, and September with the highest number of events also between May and August.

Table 17: Severe Storms (1996 – 2013) by Month

Month	Thunderstorms and Wind	Hail	Total
January	2	0	2
February	0	0	0
March	0	5	5
April	0	0	0
May	9	8	17
June	27	19	46
July	24	11	35
August	13	9	22
September	6	2	8
October	2	0	2
November	0	0	0
December	0	0	0

Source: The National Oceanic & Atmospheric Administration 2013

Conditions Contributing to Risk

Three basic ingredients are required for a thunderstorm to form: moisture, rising unstable air (air that keeps rising when given a nudge), and a lifting mechanism to provide the "nudge." With these ingredients having the ability to originate throughout the Montachusett Region, severe storms can affect every community as shown in Table 18 below. Communities that stand out as having the highest number of thunderstorms and high wind events include Athol (9), Leominster (9), and Lunenburg (10). Communities with the highest number of hail events include Gardner (8), Lunenburg (8), and Townsend (11). No relationship could be determined between the community's location in the region and the number of severe storm events.

Table 18: Severe Storms (1996 – 2013) by Municipality

Community	Thunderstorms & High Winds	Hail
Ashburnham	3	2
Ashby	6	0
Athol	9	4
Ayer	2	1
Clinton	1	2

Fitchburg	5	1
Gardner	3	8
Groton	5	2
Harvard	5	0
Hubbardston	1	0
Lancaster	1	1
Leominster	9	1
Lunenburg	10	8
Petersham	1	2
Phillipston	0	2
Royalston	1	0
Shirley	4	0
Sterling	2	3
Templeton	4	2
Townsend	5	11
Westminster	2	2
Winchendon	4	2

Source: The National Oceanic & Atmospheric Administration 2013

Future Occurrences

Severe storms consisting of thunderstorms, high winds, and hail will undoubtedly continue to affect all municipalities of the Montachusett Region and are more likely to occur between May and August. Over the past 18 years, the communities of Athol, Gardner, Leominster, Lunenburg, and Townsend have more occurrences than other MRPC municipalities. This trend may or may not continue into the future although the possibility exists.

WINTER STORMS (HEAVY SNOW/NOR'EASTERS/BLIZZARDS/ICE)

Winter weather in Massachusetts and southern New England can be described as unpredictable. Days of frigid, arctic air and below freezing temperatures may be followed by days of mild temperatures in the 40s or 50s. Heavy snow, Nor'easters and ice storms are relatively common. MEMA monitory the NWS alerting systems during periods when winter storms are expected, and serves as the primary coordinating arm in the state-wide management of all types of winter storms. The local community is responsible for the basic management of winter storm responses. When local resources for winter storm management are exhausted, assistance can be requested through MEMA's Area office.

Past Occurrences

As can be seen in Table 19 below, there have been 10 winter storm related federally declared disasters over the last eighteen years. One of the most significant for the Montachusett Region occurred on December 11, 2008 when the region's dependence upon electricity was exposed when a winter storm brought significant sleet and a heavy layer of ice resulting in downed trees and power lines, blocked

roads, and large scale power outages causing the Governor to declare a State of Emergency. Within the region, there were over 43,264 households and businesses without power. The storm raised heavy controversy over the slow return of power; it wasn't until approximately December 24th when power was essentially restored to all of the Montachusett Region with utility workers from more than several states called in to provide essential repair services. A rare October snowstorm in the year 2011 also had a significant impact on the Montachusett Region with many households and businesses losing power for several days as tree limbs with leaves that were still green downed power lines and blocked roads

Table 19: Snow Related Disasters (1996 to 2013)

Disaster Name (Date of Event)	Disaster #(Type of Assistance)
January Blizzard (January 1996)	FEMA-1090-EM (Public)
March Blizzard (March 2001)	FEMA-3165-EM (Public)
February Blizzard (February 17-18, 2003)	FEMA-3175-EM (Public)
December Blizzard (December 6-7 2003)	FEMA-3191-EM (Public)
January Blizzard (January 22-23 2005)	FEMA-3201-EM (Public)
April Nor'easter (April 15-25, 2007)	FEMA-1701-DR-MA (Public)
December Ice Storm (December 11, 2008)	FEMA-1813-DR-MA (Public)
January Snow Storm (January 11-12, 2011)	FEMA-1959-DR (Public)
October Snow Storm (October 29-30, 2011)	FEMA-4051-DR (Public)
February Blizzard (February 8-9, 2013)	FEMA-4110-DR (Public)

Source: FEMA 2013

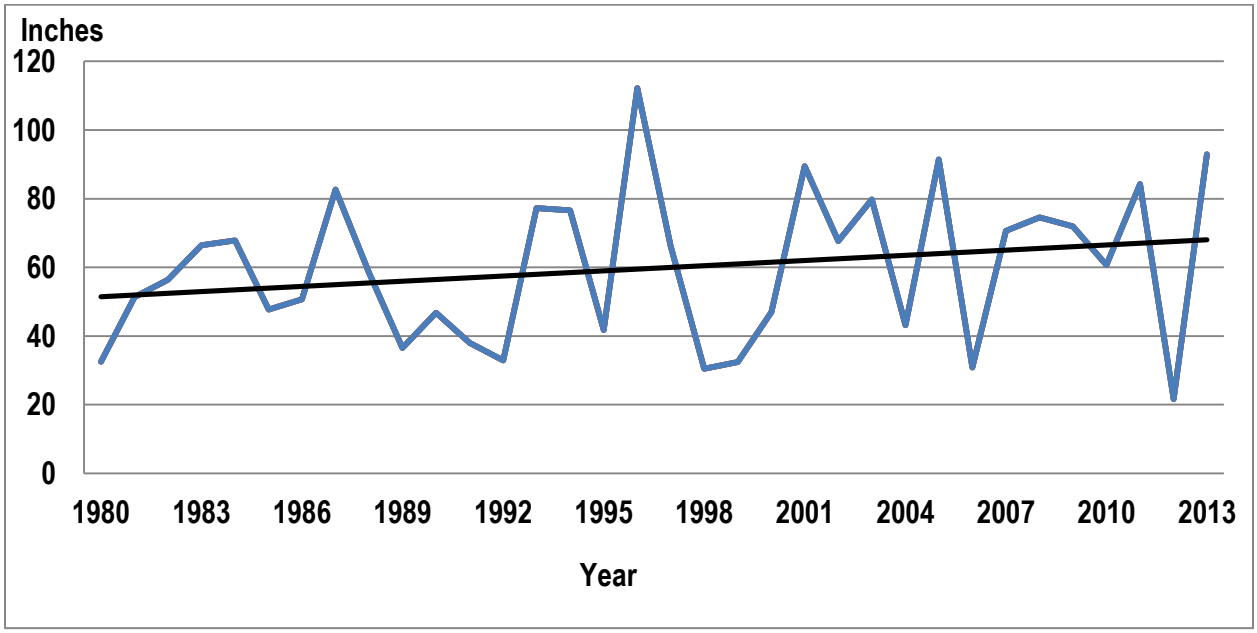
The National Climatic Data Center (NCDC), a division of NOAA, reports statistics on severe winter storms from 1996 through 2013 for the Montachusett Region. During this time, the Montachusett Region experienced 128 winter storms, an average of about 7 per winter. The vast majority of severe winter storms that have affected the Montachusett Region have occurred between December and March, as 120 of the 128 (93.75%) came in one of these four months. The most likely month for a winter storm was January, when about 28% of all winter storms occurred. See Table 20 below.

Table 20: Winter Storms in Montachusett Region by Month (1996 – 2013)

Month	Number of Storms	% of Total
October	2	1.56%
November	3	2.34%
December	30	23.44%
January	36	28.13%
February	27	21.09%
March	27	21.09%
April	3	2.34%
Total	128	
Average Per Year	7	

Source: The National Oceanic & Atmospheric Administration 2013

It is also interesting to note that, similar to rainfall, there has been a gradual increase in the amount of snowfall since 1980 in the Montachusett Region as depicted in the chart below.



Source: The National Oceanic & Atmospheric Administration 2013

Conditions Contributing to Risk

The Montachusett Region is at a high risk for coastal winter storms and heavy snow. It is also quite typical for the Montachusett Region to receive an ice storm when cold air in the valleys is "overridden" by milder, moist air from the Atlantic. Freezing rain causes dangerous traveling conditions. Bridges and overpasses, which typically freeze quicker than other surfaces, are particularly hazardous to drivers. Power outages are also common in an ice storm. The weight of the ice formed by **freezing rain** often

causes downed power lines and tree limbs, leaving thousands in the affected area without electricity.

Future Occurrences

According to Table 20, the Montachusett Region averages about seven severe winter storms per winter. The highest risk for these storms is in the month of January although storms have occurred as early as October and as late as April. Severe winter storms can have significant hazardous impacts in April/October with heavy snow and/or ice accumulating on trees with foliage causing tree limbs to crack and fall downing power lines and blocking roads and contributing to future wild fires.

Geologic Hazards

EARTHQUAKES

An earthquake is the sudden release of strain vibration, sometimes violent, of the earth's surface that follows a release of energy in the earth's crust. The exact earthquake mechanism is still unknown; however, New England's earthquakes appear to be the result of the cracking of the surface due to the compression and buckling of the North Atlantic Plate.

Previous Occurrences

The Montachusett Region has been affected by relatively small earthquake events between 1978 and 2014. Table 21 shows the locations of earthquake occurrences during this time period. There have been six earthquake events that have had their center in the Montachusett Region between 1978 and 2014. The earthquakes ranged from 0.6 to 2.4 on the Richter Scale.

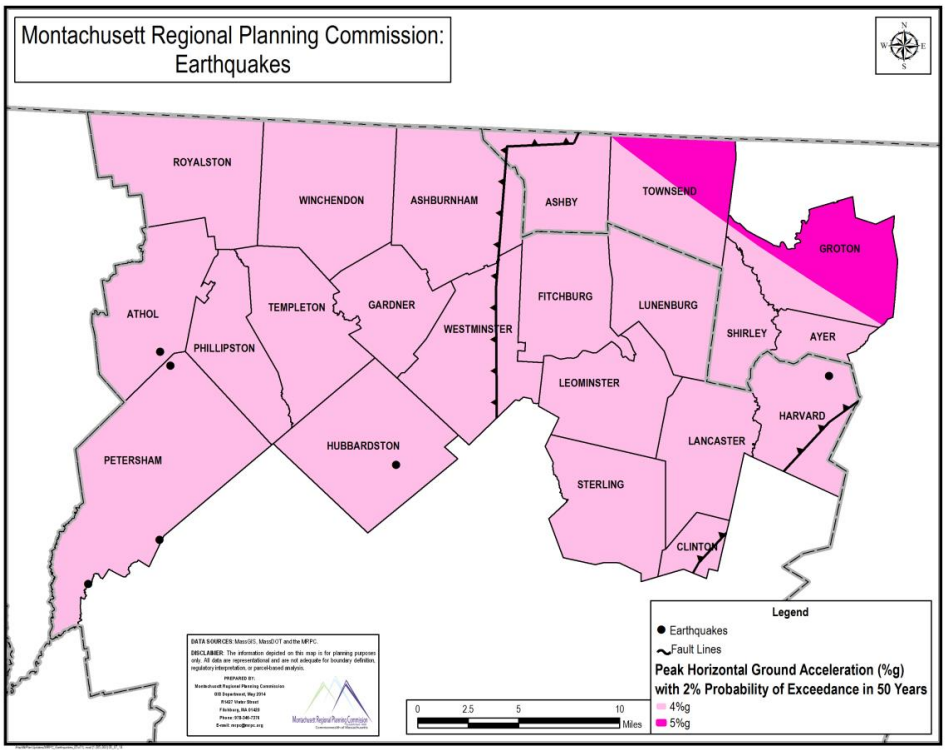
Table 21: Earthquake Occurrences in the Montachusett Region 1978-2014

Location	Date	Magnitude
South of Athol	11/9/82	2.3
Northeast of Quabbin Reservoir	2/9/83	2.0
Littleton	7/13/93	1.6
West of Barre	10/2/94	2.4
Quabbin Reservoir	9/20/96	2.2
12KM South of Gardner	12/30/12	0.6

Source: New England Seismic Network

Conditions Contributing to Risk

The map below shows the Peak Ground Acceleration (PGA) zones for the Montachusett Region. PGA represents a model showing the probability that ground motion will reach a certain level. The model shows peak horizontal ground acceleration (the fastest measured change in speed, for a particle at ground level that is moving horizontally due to an earthquake) with a 2% probability of exceeding this percentage in 50 years. Essentially, 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.



Future Occurrences

Based on the historic occurrences, which have been few and of limited severity, the Montachusett Region is considered to be at a low risk for major earthquake damage in the future.

Other Natural Hazards

LANDSLIDES

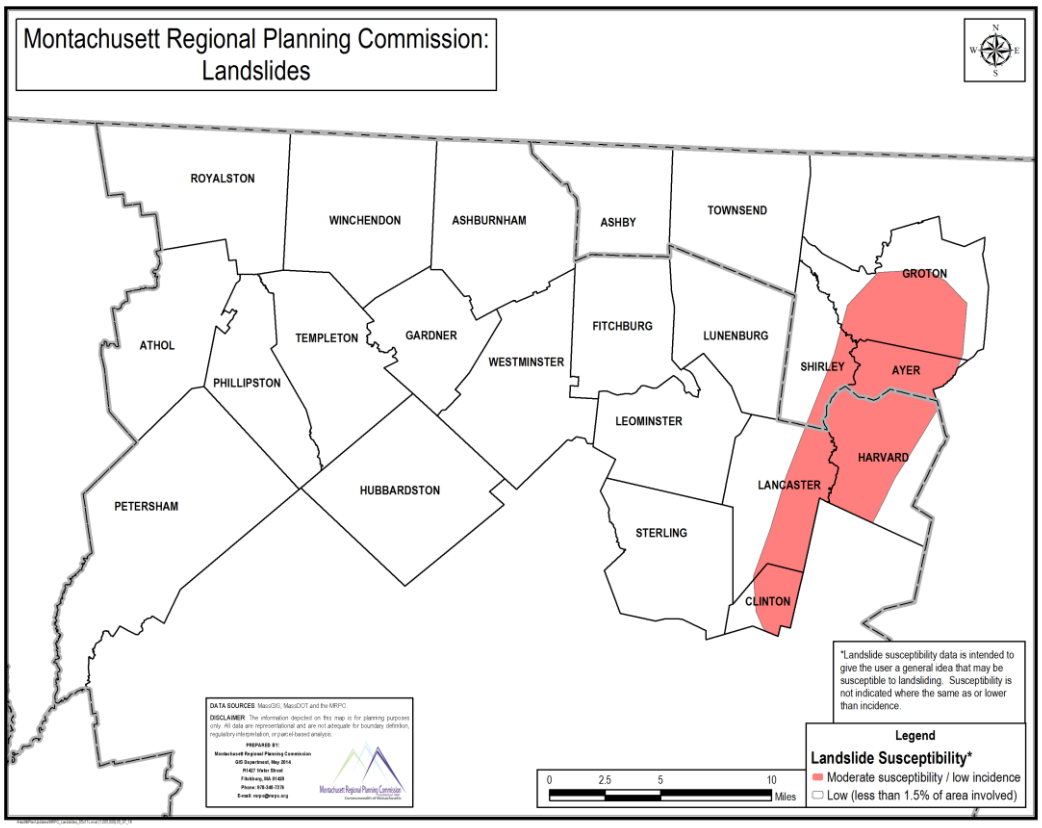
Landslides include a wide range of ground movement, such as rock falls, deep failure of slopes, and shallow debris flows.

Previous Occurrences

The data for landslides in the Montachusett Region is very limited and there is nothing that can be presented in this report.

Conditions Contributing to Risk

The Montachusett Region is considered to be a low risk for landslides. However, the eastern portion of the region, as indicated in the map below, is classified as having a moderate susceptibility/low incidence.



Future Occurrences

While the region is at a low/moderate risk for landslides, the possibility should be recognized.

WILDFIRES/URBAN FIRES

A wildfire can be defined as a naturally occurring, highly destructive, uncontrollable fire. Risk of wildfires has the potential to be significant in the Montachusett Region and area communities because of the many heavily wooded areas. Wildfire risk to developed areas is less, given the existing fire protection service and facilities. However, new construction in heavily wooded areas could pose a threat if vegetation is not managed properly.

Previous Occurrences

The Table below shows the number of wildfires that have occurred in the Montachusett Region between 2009 through 2013. The Cities of Fitchburg and Leominster have the highest number of fires (229 and 247 respectively) but Groton has by far the highest acreage at 416.

Table 22: Fire Totals and Acreage

Community	Total Fires (2009-2013)	Acreage	Acreage/Fire
Ashburnham	13	4.1	0.32
Ashby	1	0.0	0.00
Athol	37	82.2	2.22
Ayer	37	64.1	1.73
Clinton	73	58.5	0.80
Devens	57	86.3	1.51
Fitchburg	229	34.4	0.15
Gardner	68	13.0	0.19
Groton	23	416.0	18.09
Harvard	47	2.0	0.04
Hubbardston	29	14.8	0.51
Lancaster	25	14.0	0.56
Leominster	247	34.0	0.14
Lunenburg	46	26.3	0.57
Petersham	5	4.8	0.95
Phillipston	0	0.0	0.00
Royalston	1	6.0	6.00
Shirley	0	0.0	0.00
Sterling	61	2.1	0.03
Templeton	11	2.0	0.18
Townsend	13	9.0	0.69
Westminster	47	29.4	0.62
Winchendon	47	23.1	0.49
Total	**1,117**	**925.9**	**0.83**

Source: Massachusetts Fire Incident Reporting System (MFIRS), 2014

Conditions Contributing to Risk

Wildfires are influenced by three major factors: weather, topography, and fuel. These three factors can combine in different ways to produce different levels of wildfire threats. Weather, in particular long periods of drought but also lightning strikes and winds influence the behavior of wildfires. Fire hazard is generally higher in the spring and fall when there are dry and windy conditions. Topography is a factor as steep slopes and gulleys can act as a chimney for fires and the presence or lack of fuel – low shrubs and branches, wood, roofs, wood piles, etc. – can shape the resulting fire.

It should be noted that about 67% of the Montachusett Region is made up of forest. Moreover,

substantial logging occurs in some of the more rural communities leaving behind lots of brush, stumps and debris. The December 2008 Ice Storm also brought down a tremendous amount of tree limbs throughout the entire region substantially adding to the fuel for any potential wildfire.

Future Occurrences

Fires within the Montachusett Region are highly dependent on moisture and underbrush. When the region is in a drought, the chance of fire increases. It was stated at virtually all of the Montachusett Region individual Hazard and Vulnerability Sessions that wildfires are a much more significant problem for the communities than urban fires. Not only does substantial logging occur in some communities leaving behind lots of brush, stumps and debris but the devastating December 2008 Ice Storm brought down a tremendous amount of tree limbs throughout the entire region which is a major contributor of fuel to any potential wildfire. Most of the region is "ripe" for large wildfires due to the presence of old growth and tree limbs brought down by the 2008 ice storm. Moreover, many property owners may not understand the need to clear areas around properties to prevent losses. The town would have difficulty dealing with wildfires due to the lack of appropriate equipment and personnel.

MAJOR URBAN FIRES

Urban fires are of minimal concern in the majority of the Montachusett Region due to the lack of an urbanized area. The cities of Fitchburg, Gardner, and Leominster and a few towns have a larger amount of developed land than the rest of the region, but the risk is mostly limited to single buildings and not larger areas.

DROUGHTS

Drought is a temporary irregularity and differs from aridity since the latter is restricted to low rainfall regions and is a permanent feature of climate. Drought occurs in virtually all-climatic zones yet its characteristics vary significantly from one region to another, since it is relative to the normal precipitation in that region. The American Meteorology Society defines drought as a period of abnormally dry weather sufficiently long enough to cause a serious hydrological imbalance. The National Climatic Data Center uses the Palmer Drought Severity Index (PDSI) to compute drought conditions. 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.

Previous Occurrences

The Commonwealth of Massachusetts is often considered a "water-rich" state. Under normal conditions, regions across the state annually receive between 40 and 50 inches of precipitation. However, Massachusetts can experience extended periods of dry weather, from single season events to multi-year events such as experienced in the mid-1960s. Historically, most droughts in Massachusetts have started with dry winters, rather than a dry summer.

Periods of drought are relatively uncommon in the Montachusett Region but they do occur. Notable times of water stress were experienced in the region during the 1960's and more recently in the years

1999, 2000, and 2002. According to the Massachusetts Department of Conservation and Recreation, the Central Drought Region, of which the Montachusett Region is part, experiences 50 months of drought emergency per 100 years.

Conditions Contributing to Risk

Drought is a normal, recurrent feature of climate that occurs in all climatic zones across the northeast. Drought should be considered relative to some long-term average condition of balance between precipitation and evapotranspiration (i.e., evaporation + transpiration) in a particular area. it is also related to the timing and the effectiveness of the rains (i.e. rainfall intensity, number of rainfall events). Other climatic factors such as high temperature, high wind, and low relative humidity can significantly aggravate its severity.

The beginning of a drought is difficult to determine. Several weeks, months, or even years may pass before drought conditions become apparent. The first evidence of drought usually is seen in record low levels of rainfall, and the soil moisture becomes unusually low. The effects of a drought on streamflow and water levels in lakes and reservoirs may not be noticed for several weeks or months. Ground water levels may not reflect drought conditions for a year or two later. The end of a drought can occur as gradually as it began. Dry periods can last for 10 years or more.

Future Occurrences

Multi-year droughts will continue to occur in the region. It will require vigilance to ensure that sufficient water supplies are available for human consumption and for maintaining base stream flow to support aquatic wildlife. The population of the Montachusett Region is growing along with land under development, although not substantially particularly during the recent economic downturn. However, this has reduced the amount of land under forest cover.

According to the Massachusetts Drought Management Plan, “Municipal governments are critically important to managing drought situations and assessing the impact of drought situations.” To protect water supplies, local communities must carefully maintain and protect existing reservoirs and groundwater supplies, continue efforts to limit unnecessary water use through conservation measures, and control storm water runoff. Limiting or prohibiting new storm water discharges into municipal drainage systems and encouraging or requiring that storm water be contained on-site for groundwater recharge will help to maintain stream flow in drought conditions. Local water suppliers are also encouraged to develop Drought Plans that include drought indicators and drought triggers. Following the plan may lead to the institution of voluntary or mandatory water use restriction policies.

BEAVER DAMS

In all of the communities of the Montachusett Region beavers have been a concern. It takes a great deal of time and expense to control their activities. During most of the Hazard Identification meetings, time was spent on beaver related issues. These hazards of course relate directly to other hazards such as rain storms, hurricanes, floods, and winter related storms.

Previous Occurrences

The beaver is a valuable component of Massachusetts' fauna. Beavers have played an active role in New England's ecology for thousands of years. Beavers are natural "engineers" of the land, they are agents of change, creating wetlands out of uplands and streams, and providing habitat for a variety of plants and animals. However, not long ago the beaver was absent from the Montachusett Region. In fact, it was absent from the late 1700s to the early 1900s. Intensive unregulated hunting and trapping, combined with deforestation to clear land for agriculture, led to the disappearance of beaver habitat and the beaver. In the early 1900's, forested habitat started to recover when many farmers abandoned their farms in order to take jobs in cities or to start new farms in the more fertile Midwestern United States. With the forests able to retake the landscape, the beaver was able to return and an important component of the Montachusett Region's native ecosystems was restored. However, beavers returned to a landscape that had been substantially altered by people.

Conditions Contributing to Risk

When beavers in the Montachusett Region build their dams in areas where there is increased residential development, roads and agricultural use of the land, the flooding that results can cause serious public and private property damage, often threatening homes, septic systems, low-lying roadways, and other public infrastructure. It was stated at all of the Montachusett Region individual Hazard and Vulnerability Sessions that beavers continue to pose a significant problem. The state and local governments have responded to this crisis with a complex regulatory process. The process places its highest priority on protecting in-ground septic systems and road networks. Most of the regulatory process has been developed to respond to threats to the public health and safety.

Future Occurrences

Beaver activity will most certainly continue to persist throughout the Montachusett Region, as the factors that have allowed them to expand their range (increase in suitable habitat, wetland protection, and a decrease in hunting and trapping) are expected to remain constant over the next decade.

5. Town of Ashby Natural Hazard Risk Assessment

Community Profile: Ashby

Ashby is located in the northwestern part of Middlesex County, north of Worcester on the New Hampshire border. To the east it is bordered by the towns of Townsend and Lunenburg, to the south is the City of Fitchburg, and to the west is Ashburnham. On the north it is bordered by the New Hampshire towns of Ipswich and Mason. Ashby is 8 miles north of the center of Fitchburg, 32 miles north of Worcester, 49 miles northwest of Boston, 87.1 miles from Springfield, 97.5 from Hartford, and 212 miles from New York City. Looking north Ashby is only 24.4 miles south of Nashua, New Hampshire.

The town of Ashby covers an area of 24.17 square miles with a resident population of 3,074, according to the 2010 US Census. The population density is 127 people per square mile. There are 1,191 housing units in the town, and the average household size is 2.78 people. The median age of residents is 42.

Ashby was once an outpost of Lunenburg, and was incorporated in 1767. Ashby was originally agrarian; however, by the mid-eighteenth century the town began to harness its fast flowing streams for water powered manufacturing. The first grist mill was built in 1750. Other manufacturing included sawmills, a wood turning mill, wool carding, and several food-processing mills. In 1831 the Lawrence Brothers and Martin Allen made the first wooden tubs and pails in Massachusetts. Three noted clockmakers, Abraham Edwards, the Willard Brothers, (Alexander and Philander) worked in Ashby. Jonas Prescott Whitney fashioned church organs. A unique cottage industry was the braided palm leaf hats made by women Ashby.

Ashby is primarily a residential community with a small commercial base of 156 home based businesses. Much of the town-of-the century look remains today in the Ashby Historic District, center around Ashby's Town Common. The town is characterized by rugged, hilly terrain interspersed with gently rolling open fields, woodland, streams and wetlands. Ashby's strengths are its rural character and natural resources. Recreational opportunities are abundant as Ashby. Mount Watatic, Willard Brook State Park, Pearl Hill State Park and Blood Hill State Park attracting tourists to the area. Ashby Elementary School and Bain Pest Control Services are the two major employers in Ashby.

Critical Facilities

Table 23: Ashby Critical Facilities

Feature Type	*Name*	*Address*
City/Town Halls	Ashby Town Hall	895 Main Street
DPW Facilities	Ashby DPW	93 Breed Road
Early Education Childcare Facilities	Doody, Christine	176 Piper Rd
	The Children's Garden Nursery School	247 Locke Rd
Emergency Dispensing Sites	Ashby Elementary	911 Main Street
Emergency Operations Centers	Ashby Police Station	895 Main Street

	Ashby Fire Station	1093 Main Street
Emergency Shelters	Ashby Fire Station	1093 Main Street
	Ashby Elementary School	911 Main Street
	Ashby Town Hall	895 Main Street
End of Life Facilities	Ashby Elementary School	911 Main Street
Fire	Ashby Fire Station	1093 Main Street
Other Critical Facilities	Mr. Mike's	1274 Main Street
	31 Store	704-1 Fitchburg State Road
	4-H Camp Middlesex	1031 Erickson Road
	Ashby Market	840 Main Street
	Allen Field	530 West Road
	Ashby Cell Tower #1	1140 Greenville Road
	Ashby Common & Gazebo	Main Street
	Ashby Cell Tower #2	603 Fitchburg State Road
	Ashby Cell Tower #3	20 Common Road
	Spring Hill Wellness	250 Spring Hill Road
	Ashby Market	873 Main Street
Other Government Buildings	Ashby Highway Department	92 Breed Road
	Ashby Public Library	812 Main Street
	Maja Hall	47 Ericson Rd.
Police	Ashby Police Station	895 Main Street
Public Health Office	Ashby Board of Health	895 Main Street
Public Water Supply*	Ashby Elementary School	
	Well #2	
	Well #1	
	Crossroads For Kids/Camp Lapham	
	Dcr Willard Brook State Forest	
	Pines Campground	
	Evergreen Family Restaurant	
	The Gardeners Cottage	
	Fitchburg Reservoir	
	Country Creamery	
	The Children's Garden Nursery School	
	Ashby Diner	
	Ashby Market	873 Main Street
	Ashby Elementary School	911 Main Street
	Fitchburg Reservoir	
	Ashby Academy Well #1	250 Spring Hill Road

	Ashby Academy Well #2	250 Spring Hill Road
	Crossroads For Kids/camp Lapham	731 South Road
	Pines Campground	39 Davis Road
	The Children's Garden Nursery School	247 Locke Road
School	Ashby Elementary School	911 Main Street
	Children's Garden Nursery School	247 Locke Road
Sports and Cultural Areas	Congregational Church	21 New Ipswich Road
	First Parish Unitarian	20 Common Road

*As stated in 310 CMR 22.02, a Public Water System means a system for the provision to the public of piped water for human consumption if such system has at least 15 service connections or regularly serves an average of at least 25 individuals daily at least 60 days of the year" (Mass GIS, 2014).

Flood Prone Areas

Particular areas within the community where the risk of flood areas are or could occur are shown on the Ashby Local Hazards Assessment Map (Appendix 2), as determined at the first meeting of the Ashby Local Hazard Mitigation Team held on April 25, 2012.

Flooding Vulnerability Assessment

An analysis of the FIRM flood hazard area maps indicates that there is a total of 911.63 acres of 100-year floodplain within Ashby. This amounts to 5.92% of the total town. Based on additional analysis, 12.09 acres (1.33%) of the floodplain are developed. Currently there are 34 structures in the floodplain which is about 1.52% of the total structures in the community. The buildings are then multiplied by the building value, as determined by the MA Department of Revenue, to come up with a potential loss of $31,145,900.

According to National Flood Insurance Program (NFIP) data, there are no flood insurance claims in Ashby.

Excluding dams and bridges there are there are no critical facilities within the 100 year flood zone.

Structurally Deficient Bridges Over Waterways

Ashby has one bridge over water that is classified by MassDOT as "structurally deficient. The bridge is on Turnpike Road over Trapfall Brook.

Hazard Potential of Dams

The DCR Office of Dams Safety lists seven dams in the Town of Ashby as shown in Table -24. Two dams, Ashby Reservoir Dam and Damon Pond Dam are classified as high hazard.

Table 24: Dams – Ashby

Town	Dam	Hazard Code	Owner
Ashby	Ashby Reservoir Dam	High Hazard	Public
Ashby	Damon Pond Dam	High Hazard	Public
Ashby	Fitchburg Reservoir North Dam	Low Hazard	Public
Ashby	Fitchburg Reservoir S.E. Dam	Low Hazard	Public
Ashby	Fitchburg Reservoir South Dike	Low Hazard	Public
Ashby	Pond at West Road	Low Hazard	Private
Ashby	Mount Watatic Dam	N/A	Private

*N/A – Information not available as the dam is non-jurisdictional.

Risk Assessment

Based on the hazards identified in this plan and the assessment of risks by the Town of Ashby, the town considers itself to be at a high risk for Heavy Rain, Snow Melt, Beavers, Ice Storms, Heavy Snow, Blizzard; moderate risk for Dam Failure, Hurricanes, Tornados, High Winds, Nor'easters, Severe Thunderstorms, Major Urban Fires, Wild land Fire, Drought, Extreme Temperatures; low risk Ice Jams, Earthquakes, and Landslides. This information is documented in the Ashby Natural Hazard Matrix and is shown on the Ashby Local Assessment Map (Appendix 2) which was reviewed at the first meeting of the Ashby Local Hazard Mitigation Team held on April 25, 2012.

Existing Protections Matrix

To update Ashby's initial Hazard Mitigation Plan, the original inventory of hazard mitigation actions which the community has undertaken in the past was reviewed and updated in collaboration with the Local Hazard Mitigation Planning Team. The following provides the updated inventory of what is currently being done to mitigate hazards by listing the programs and activities already in place. It includes a description of the protection measure, who is responsible, and improvements and changes that may be needed. This inventory was used by the Planning Team to identify gaps in existing protections that were then addressed through the development of this plan update.

Type of Existing Protection	Description	Area Covered	Effectiveness and/or Enforcement	Improvements or Changes Needed
Flood Related Hazards				
Storm water management standards	State Regulation under the Wetlands Protection Act to regulate storm water and other point source discharge	Town-Wide	Enforced by the Conservation Comm. (Wetlands Protection Act) and Planning Board (Subdivision Control Law and site plan review)	
Rivers Protection Act	State Law 310 CMR 10.58 & Local bylaw Article V Sect. 18 development and activity in riverfront area	200-foot [(1)]	Enforced by the Conservation Comm. & DEP	
Wetlands Protection Act (state) and Wetlands Protection Bylaw (local)	State and local laws regulating development and activity within wetland buffer zone	100-foot state buffer around wetland area [(2)]; local bylaw policy requires a 30 foot no disturb area closest to wetland	Enforced by the Conservation Commission	
100 Year Flood Zone [(3)] Town Bylaw Sec. III. H. Flood Plain Districts	State law and local bylaw requiring elevation above 100-year flood level of new and substantially improved residential structures in floodplain	100-year floodplain as shown on Flood Insurance Rate Map dated Nov. 19, 1986	Enforced by the Building Inspector and Conservation Commission	Update Insurance Flood Rate Maps
Maintenance of municipal storm water drainage system	Regular cleaning of catch basins, storm drains, and culverts	Town-Wide	Directed by the Department of Public Works	Additional Personnel and Equipment Needed

Culverts replacement	Replacement of Culverts that are Undersized and/or Deteriorated	Town-Wide	Directed by the Department of Public Works	Culverts in Flood Areas to be Evaluated for Replacement
Maintenance of public water bodies (ponds, streams, brooks, wetlands)	Periodic cleaning of waterways needed, e.g., remove trash, debris	Town-Wide	Directed by the Department of Public Works with guidance from Conservation Commission	

Wind Related Hazards				
State Building Code	State Law related to design loads to include wind effects	Town-Wide	Enforced by Building Department	
Tree Maintenance	Regular inspection and tree maintenance to cut branches threatening power lines and overhead utilities	Town-Wide	Utility Companies	Additional Staff
Winter Storms Related				
Clearing Snow from Major Arterial Routes	Ensure Access to Emergency Services	Town-Wide	Department of Public Works	Additional personnel and equipment needed

Mitigation Goals, Objectives and Strategy

Goals, Objectives, and Strategies developed by the Town of Ashby's Local Hazard Mitigation Planning Team to implement a comprehensive hazard mitigation program are presented below. These goals, objectives and strategies are based on the data provided in previous sections of this Plan, and especially the Risk and Vulnerability Assessment, the Hazard Mitigation Matrices, and the Ashby Action Plan.

Overall Goal Statement: To prepare to reduce the loss of life, property, infrastructure and cultural resources throughout the community from natural disasters through a multiple hazard mitigation program that involves increased coordination, planning, education, and capital improvements.

1. Objective: To organize and prepare to provide adequate shelter, water, food, and basic first aid to displaced residents in the event of a natural disaster, and to provide adequate notification and information regarding evacuation procedures, etc., to residents in the event of a natural disaster.

2. Objective*:* To inventory supplies at existing shelters and develop a needs list and storage requirements; and to establish arrangements with local or neighboring vendors for supplying shelters with food and first aid supplies in the event of a natural disaster.

3. Objective: To have the EMD lead an effort to increase coordination between departments in pre-disaster planning, and implementation of hazard mitigation projects.

4. Objective: Increase awareness of hazard mitigation among town officials, private organizations, businesses, and the general public.

5. Objective*:* To examine and update the current notification system including the progress made by the Central Mass Homeland Security Committee's development of a county-wide Reverse 911.

6. Objective*:* To collect, periodically update, and disseminate information on which local radio stations provide emergency information, what to include in a 'home survival kit,' how to prepare homes and other structures to withstand flooding and high winds, and the proper evacuation procedures to follow during a natural disaster.

7. Objective*:* To have the Highway Department obtain an emergency back-up power supply to enable gas to be pumped when power to commercial gas stations may be interrupted.

Specific Natural Hazard Goals for Ashby

Goal Statement for Flooding: To prepare emergency staff and volunteers in order to minimize the loss of life, damage to property, and the disruption of governmental services and general business activities due to flooding.

1. Objective: To continue to participate in the National Flood Insurance Program and to have the flood maps periodically updated.

2. Objective*:* To Develop a priority list and seek funding through the Hazard Mitigation Grant Program (HMGP) for the replacement of undersized culverts throughout the town.

Goal Statement for Protection from Beavers: To minimize the threat to health, the damage to roads and property, and the disruption of governmental services and general business activities due to flooding caused by beavers.

1. Objective: Support local town departments to continue present methods to prevent beaver caused flooding.

2. Objective: Seek assistance from beaver management professionals, including trappers.

3. Objective: Install beaver management devices.

Goal Statement for Hurricanes and Tornadoes: To minimize the loss of life, damage to property, and the disruption of governmental services and general business activities due to high winds associated with hurricanes and tornadoes. (The objectives listed above, under flooding, address the flooding that can result from a hurricane.)

1. Objective: To educate residents and volunteers regarding the safe methods and actions necessary to deal with Hurricanes and Tornadoes.

Goal Statement for Winter Related Hazards: To minimize the loss of life, damage to property, and the disruption of governmental services and general business activities due to severe snow and ice storms.

1. Objective: To develop a plan for providing access to water, information, shelter, and food stores to people in remote locations in the event of a severe winter storm.

Goal Statement for Earthquakes: To educate staff, residents and volunteers about the potential for earthquakes and strategies to minimize the loss of life, damage to property, the disruption of governmental services and general business activities due to earthquakes.

1. Objective: To educate and encourage homeowners and developers to rehab and build using methods to minimize the effects of earthquakes and other disasters.

Mitigation Action Plan

An initial Mitigation Action Plan for the Town of Ashby was presented in the community's Hazard Mitigation Plan that was approved by FEMA on February 26, 2009. The original Mitigation Action Plan was developed through an inventory of potential hazards which could impact the community and an evaluation of a range of alternatives to address these hazards. As part of the plan update process, the original Mitigation Action Plan was reviewed by the town's Local Hazard Mitigation Planning Team to delete actions which have already been completed, add additional actions which are either underway or planned to be undertaken, and to update the current status of all actions. An additional step in this process was to conduct a "STAPLEE" analysis for each action and a subjective evaluation of each action's perceived cost/benefit. The revised Mitigation Action Plan matrix, shown below, identifies each mitigation action, the responsible department or board responsible for implementation, potential funding sources, the current status of the action, results of the STAPLEE analysis, and the perceived cost/benefit for each mitigation action.

The STAPLEE analysis provided a means for the community to prioritize actions based on relative scores. For each proposed mitigation action in the community's action plan, representatives of the Local Hazard Mitigation Planning Team were asked to review the following questions:

- Social: Is the proposed action 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 action? Is there someone to coordinate and lead the effort?
- Political: Is the action politically acceptable? Is there public support both to implement and to maintain the action?
- Legal: Is the community authorized to implement the proposed action? Is there a clear legal basis or precedent for this activity?
- Economic: What are the costs of this action? Does the cost seem reasonable for the size of the problem and the likely benefits?
- Environmental: How will the action impact the environment? Will the action need environmental regulatory approvals?

Each proposed mitigation action was then evaluated and assigned a score (Good = 3, Average = 2, Poor = 1) based on the above STAPLEE criteria. An Excel spreadsheet with each of the proposed mitigation actions was provided to all members of the community's Multi-Hazard Planning Team to record and total the results of the evaluation. The final STAPLEE score for each action is shown in the following matrix. The higher the score for each action, the higher the priority for the community. Note that there were variations in the ways individual communities applied the STAPLEE criteria and scoring. As a result, the scoring of actions between communities may not be comparable.

ASHBY'S COMMUNITY ACTION PLAN
IMPLEMENTATION STRATEGY FOR PRIORITY MITIGATION ACTIONS

MITIGATION ACTION	RESPONSIBLE DEPARTMENT/BOARD	POTENTIAL FUNDING SOURCE(S)	STATUS/PROPOSED COMPLETION DATE	STAPLEE SCORE	COST/BENEFIT EVALUATION
Work with Neighboring Communities to Establish a Community Emergency Response Team (CERT)	Board of Selectmen, Police & Fire Departments, EMD	Town Staff/Volunteers	Haven't done anything yet. Keep as On-Going.	19	Yes
Identify Existing Shelters that are Earthquake Resistant as well as Outside of Floodplain (and Dam Inundation) Areas	Building Inspector, EMD	Town Staff	Elementary School	20	No
Develop and Distribute an Educational Pamphlet on Fire Safety and Prevention (SAFE PROGRAM)	Fire Department	Town Staff	on going	20	Yes
Collect, Update, and Disseminate Information on Local Radio/TV Stations Emergency Information	EMD	Town Staff	Update Yearly	17	No
Inventory Supplies at Existing Shelters and Develop a Needs List and Storage Requirements	Emergency Management Planning Committee, School Facilities Manager	Town Staff	Utilize Red Cross	21	No
Develop a Plan for Providing Access to Water, Information, Shelter, and Food Stores to People in Remote Locations of the town in the event of a Severe Winter Storm	EMD	Town Staff/Volunteers	ongoing	21	No
Develop a Preliminary Project Proposal and Cost Estimate for Updating Current 911 System including Feasibility of Reverse 911	Board of Selectmen, EMD	Town Staff/Volunteers	Look at Current Options	17	
Prepare a Priority List for the Replacement of Undersized Culverts throughout the town	Board of Selectmen, Highway Department	Town Staff	on going	17	Yes

Update Insurance Flood Rate Maps	Conservation Commission, Board of Selectmen	FEMA/MEMA	Updated 2 years ago. Remain in contact w/ FEMA/MEMA. Estimates should now be finalized	21	No
Encourage property owners to engage in mitigation efforts	EMD, Fire Department	Property Owners	on going	14	No
Continue participation in the National Flood Insurance Program	Conservation Commission, Board of Selectmen	FEMA/MEMA	on going	21	No
Evaluate and relocate valuable and historical items and furnaces, water heaters, and electrical equipment	EMD, Fire Department	Town and Property Owners	on going	21	Yes
Disseminate Flood emergency information	EMD, Fire Department, Schools	EMD/Fire Department	on going	21	No
Enforce state building codes related to design loads to include wind effects	Building Inspector	Contractor and Property Owners	on going	21	No
Continue tree maintenance and brush clearing	Highway Department	Town Department	on going	21	Yes
Hold open house at Fire Department	Fire Department	Fire Department	Completed 2013	21	Yes
Expand residential parking bans to enable snow removal from all streets. (Parking in downtown in general)	Department of Public Works, Board of Selectmen	Board of Selectmen	Completed 2014	14	No
Identify Shelters and publicize locations	EMD	EMD/Fire Department	on going	21	No
Evacuation Routes	EMD	EMD	Updated- we are doing this with CMRPC	21	No
Install "beaver diverters" and water control devices	Department of Public Works	Department of Public Works	on going	14	No
Hire trapper for removal of beavers	Department of Public Works	Department of Public Works	On-Line Now	14	No
Purchase and distribute educational materials regarding protection from natural hazards	EMD	Board of Selectmen	on going	17	No

Implement recommendations in existing planning documents including the open space and recreation plan and the emergency evacuation plan	Conservation Commission, Board of Selectmen, Planning Board, EMD	Conservation Commission, Board of Selectmen, Planning Board, EMD	on going	21	Yes

6. Plan Adoption and Maintenance

Upon completion, the Draft Update of the Hazard Mitigation Plan for the Town of Ashby was presented at a public meeting of the Board of Selectmen. Representatives of other town boards and departments, including representatives of the Local Hazard Mitigation Planning Team were also asked for their review and comment.

Following the completion of the updates of the Hazard Mitigation Plans for each of the Montachusett communities, the individual Plans will be assembled into a Multi-Jurisdictional Plan presenting information on all communities and the Region as a whole. The public will be given an opportunity to review the Plan prior to its finalization. The final Draft Update of the Hazard Mitigation Plan will then be forwarded to the Massachusetts Emergency Management Agency (MEMA) and the Federal Emergency Management Agency (FEMA) for their review and approval. Following MEMA and FEMA approval, the approved plan will be submitted to the Ashby Board of Selectmen for formal adoption. A certificate of adoption will be incorporated into the plan. The final plan will then be incorporated into the Regional Hazard Mitigation Plan and distributed to all municipalities in the Montachusett Region for implementation.

Plan Implementation

The implementation of the Update of Ashby's Hazard Mitigation Plan will begin following its approval by MEMA and FEMA and formal adoption by the Board of Selectmen. Specific town departments and boards will be responsible for ensuring the development of policies, bylaw revisions, and programs as described in this plan.

Plan Monitoring and Evaluation

The measure of success of the Hazard Mitigation Plan will be the number of identified mitigation strategies implemented. In order for the town to become more disaster resilient and better equipped to respond to natural disasters, there must be a coordinated effort between elected officials, appointed bodies, town employees, regional and state agencies involved in disaster mitigation, and of course the general public.

Certificate of Adoption – Town of Ashby

[To be inserted upon adoption of the Plan by the Board of Selectmen]

7. Appendices

Appendix 1:Meeting Attendance Table

Community	Meeting Date	Participant	Department/Position
Ashby	*1) April 25, 2012*		
		Doug Briggs	Town Administrator
		Rick Metcalf	Board of Health
		Mike Bussell	EMD
		William Seymour, Jr.	Fire Department
		Wanda Goodwon	Fire Department
		Alan Pease	Planning Board
	2) May 15, 2013		
		William Seymour	Fire Department
		Wanda Goodwin	Fire Department
		Fred Alden	Police Department
		Mike Bussell	EMD
		Bob Hanson	Town Administrator
		Alan Pease	Planning Board
		Rick Metcalf	Board of Health
		William Davis	Highway Department
Ashburnham	*1) April 2, 2012*		
		Doug Briggs	Town Administrator
		Bob Salo	Asst. EMD/Fire Dept.
		Doug Parsons	Police Department
		Steve Nims	DPW
		Sylvia Turcotte	Administrative Assistant
	2) November 5, 2013		
		Doug Briggs	Town Administrator
		Paul Zbikowski	Fire Chief
Athol	*1) March 14, 2012*		
		David Ames	Town Manager
		Tim Anderson	Police Chief
		Deborah Karan	Board of Health
		Brianna Slowyra	Building Inspector
		Kevin Health	Athol Police
		Thomas V. Lozier	Fire Chief
		Doug Walsh	DPW
	2) March 27, 2013		
		Tim Anderson	Police Chief
		Deborah Karan	Board of Health
		Brianna Slowyra	Building Inspector
		Kevin Health	Athol Police
		Thomas V. Lozier	Fire Chief
		Doug Walsh	DPW
Ayer	*1) December 10, 2012*		
		Robert Pedrazzi	Fire Chief
		Mark Wetzel	DPW Director
		William Murray	Police Chief
	2) May 2, 2013		
		Heather Hasz	Board of Health
		Mark Wetzel	DPW Director
		Robert Pedrazzi	Fire Chief
Clinton	*1) September 20, 2013*		
		Michael Ward	Town Administrator
		Phil Duffy	Comm/ED Director
		Mark Laverdure	Police Chief
		Chris McGown	Superintendent of Public Works

	2) November 8, 2013		
		Phil Duffy	Comm/ED Director
Devens	*1) October 16, 2012*		
		Neil Angus Joseph LeBlanc Richard Nota Gabe Vellante Mark Wetzel	Devens Enterprise Cmsn Devens Fire Chief Harvard DPW Building Commissioner Ayer DPW
	2) February 3, 2014		
		Richard Sicard Robert Pedrazzi Dennis Levesque Mark Wetzel David Blazon Neil Angus Michael Hanson Peter Lowitt Joseph LeBlanc	Harvard Fire Ayer Fire/EMD Shirley Fire Ayer DPW Devens DPW DEC Lancaster Fire Department DEC Devens Fire Chief
Fitchburg	*1) September 17, 2012*		
		Kevin Curran Brenda Fitzgerald Capt. Brian Murchie Mike O'Hara Gary Bevilacqua Gary Withington Chris Stoddard Doug Maffetone Robert Lanciani Steve Curry Kevin Roy	Fire Chief/EMD Emergency Mngt. Clerk Fire /Emergency Mgmt. Planning/DPW DPW Engineering DPW Superintendent DPW Engineering Fire Department Fire Department Board of Health Fire Chief
	2) February 12, 2014		
		Thomas Dateo Robert Lanciani Chris Stoddard Glenn Fossa Kevin Roy	Fire EMD Building Commissioner DPW Engineering Fitchburg Police Fire Chief
	3) September 19, 2012		
		Kevin Curran Brenda Fitzgerald Sgt. Glen Fossa Nate LaRose Brian Murchie Mike O'Hara, Fitchburg Lisa Wong	Fire Dept. EMD Emergency Mngt. Clerk Fitchburg Police Mayor's Office Fire Department Planning/DPW Mayor
Gardner	*1) May 30, 2012*		
		Paul Topolski Rebecca K. Evanoff	Emergency Mngt. Dir. Public Health Planner
	2) November 5, 2013		
		Jim Hanslay Neil Erickson Dick Ares Paul Topolski	MWCC Campus Police Gardner Police Gardner Fire Emergency Mngt. Dir.
Groton	*1) April 16, 2013*		

		Ed Cataldo Tom Delaney Dawn Dunbar Michelle Collette April Iannacone Barbara Gannon Margot Hammer Fran Stanley Rena Swezey April Moulton John Giger Paula Martin Tom Orcutt Joseph Bosselait	Building Department DPW Land Use Land Use Water/Sewer Conservation Zoning Housing Coordinator Assessors Police Department Planning Board Land Use Water Superintendent Fire Chief
	2) October 29, 2013		
		Michelle Collette Paula Martin Joseph Bosselait Kevin Kelly Thomas Orcutt Fran Stanley Barbara Ganem Rena Swezey Tom Delaney Regina Beausoleil	Land Use Director Land Use Administrative Asst. Fire Chief Groton Electric Water/Sewer Land Use Housing Coordinator Conservation Commission Assessor DPW Land Use
Harvard	*1) January 29, 2013*		
		Liz Allard Sharon McCarthy Rich Nota Tom Philippou Chief Robert Sicard	Planning Board Board of Health DPW Board of Health Fire Department
	2) December 16, 2013		
		Tom Philippou Richard Noth Liz Allard Bill Scanlan Rick Sicard	Board of Health DPW Land Use Planner Town Planner Fire Chief
Hubbardston	*1) July 2, 2013*		
		Anita Scheipers Dennis Perron Robert Hayes Lyn Gauthier	Town Administrator Police Chief Fire Chief Highway Department
	2) November 20, 2013		
		Tom Kilhart Dennis O'Donnell Dennis Perron	DPW Director EMD Police Chief
Lancaster	*1) January 31, 2013*		
		Noreen Piazza Courtney Manning Michael Hanson, Scott MacDonald Robert Baylis Peter Munro	Town Planner Water Department Fire Department/Emg. Mngmt Highway Department Board of Health Building Inspector
	2) October 15, 2013		

		Chris Czermak Mike Hanson Noreen Piazza	DPW Superintendent Fire Chief EMD Planning Director
Leominster	*1) July 17, 2012*		
		Kate Griffin-Brooks Charlie Coggins Joanne DiNardo Alfred F. Kirouac Robert Sideleau Christopher Knuth Forrest Price, Jr	Planning Department Emergency Management Conservation Commission Fire Department Fire Department Health Director Public Health Emergency Preparedness Region 2
	2) December 18, 2013		
		Kate Griffin-Brooks Charlie Coggins Robert Healey Scott Bernier Alfred Kirouac Joanne DiNardo	Planning Department Emergency Management Chief of Police Police Department Fire Department Conservation Commission
Lunenburg	*1) September 24, 2012*		
		Patrick Sullivan Jack Rodriquenz Kerry Speidel	Fire Department DPW Town Administrator
	2) June 25, 2013		
		Jack Rodriquenz Patrick Sullivan	DPW Fire/EMD
Petersham	*1) December 19, 2013*		
		Dana Cooley Rick Marsh Lynne Shaw	Police Chief Board of Selectmen EMD
	2) May 14, 2012		
		Frederik Marsh R. Dana Cooley, Jr. Timothy Graves Lynne Shaw	Selectboard Police Chief Highway Department EMD
Phillipston	*1) June 21, 2012*		
		Richard Stevens Keven Dodge, James Mackie, Johanna Telepciak David Bramhal Tom Brouillett John Telepciak	Fire Chief Police Chief Highway Superintendent Board of Health Selectmen Selectmen Selectmen
	2) October 28, 2013		
		Kevin Dodge Amanda Belliveau Richard Stevens Mark Heisler Jim Mackie Tom Brouillet	Police Chief BOS/Administrative Asst. Fire Chief Firefighter/EMT Highway Superintendent Selectmen
Royalston	*1) February 22, 2013*		
		Jim Barclay	EMD
	2) November 8, 2013		
		Jim Barclay	EMD
Shirley	*1) September 11, 2013*		

		Kathleen Rocco J. Gregory Massak Butch Farrar Dennis Levesque Phil Farrar	BOS Executive Assistant Chief of Police Building Department Fire Chief Dept. of Public Works
	2) November 7, 2013		
		Phil Farrar Kathi Rocco Dennis Levesque Donald Farrar J. Gregory Massak	DPW Forman BOS Executive Assistant Fire Chief Building Department Chief of Police
Sterling	*1) June 28, 2012*		
		David Hurlbut Jim Emerton David Favreau Barry Lein Kenneth Gikas	EMD/Fire Chief Assistant EMD/CERT Board of Health Agent Public Health Emergency Preparedness Region 2 Public Health Emergency Preparedness
	2) June 3, 2013		
		Jim Emerton David Hurlburt Gary Chamberland Bill Tuttle	Sterling CERT EMD/Fire Chief Sterling Police Sterling DPW
Templeton	May 5, 2012		
		Richard Curtis David Whitaker J. Bennett Robert Columbus Kim Landry Lawrence Brandt Kathy Matson	Emergency Management Police Chief Board of Selectmen Resident Animal Control Officer Building Inspector CERT Administrative Asst.
	February 4, 2014		
		Kathy Matson Bud Chase J. Bennett Philip Leger Larry Brandt Raymond LaPorte Dan Keeney	CERT Administrative Asst. Highway Department Board of Selectmen Board of Health Building Inspector Templeton Fire Department Town Treasurer
Townsend	*1) March 6, 2013*		
		Andrew Sheehan Erving Marshall Richard Hanks Donald Klein Karen Chapman Carla Walter Ed Kukkula	Town Administrator Police Department Building Commissioner Fire Department Land Use Board of Health Highway Department
	2) October 8, 2013		
		Carla Walter Erving Marshall Andy Sheehan Donald Klein Ed Kukkula	Board of Health Police Department Town Administrator Fire Chief Highway Department
Westminster	*1) October 1, 2012*		

		Josh Hall Elizabeth Swedberg Steve Wallace Brenton MacAloney Karen Murphy	DPW Board of Health Town Planner Fire Chief/EMD Town Administrator
	2) September 12, 2013		
		Steve Wallace Brenton MacAloney	Town Planner Fire Chief/EMD
Winchendon	*1) August 14, 2012*		
		Thomas Smith Scott Livingston John Deline James Abare Paul Blanchard Sara Daraljiannis Ellen Decouteau	Fire Chief Police Chief DPW Health Agent/EMD Building Commissioner Region II Public Health Planning Agent
	2) July 9, 2013		
		Thomas Smith Scott Livingston John Deline James Abare Paul Blanchard John White	Fire Chief Police Chief DPW Health Agent/EMD Building Commissioner Planning Board

Appendix 2: Community Maps

Ashby, MA: Local Hazards

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Brook crossing Bennett & Watatic Mountain Rd- A series of dams downstream causes flooding along these roads routinely. The state won't open the dams due to a lack of man-power. An 80-100 ft section of Bennett Rd is flooded in times of heavy rains. The culverts have been replaced, but the dam is still a situation for a potential hazard.

There is also one home is this area that has well water issues due to this problem.

Pond north of Jones Hill Rd- Beaver activity and damming has created this pond. This dam has a potential to breach, wash across several roads and flood the meadow south of Foster Rd. A potential breach would also have a domino affect on the culvert beneath Harris Rd to the south.

Harris Road has issues of erosion concerns- washing away of roadway.

Harris Road- Both Heavy rain and snow melt are an issue in this area.

Harris Rd, west of New Ipswich Rd- This is a gravel road with a 36" squashed culvert and two 18" bypass pipes. Beavers are blocking up the culverts causing flooding and washing out of the road. This road is a dead-end, with a few homes that have no access other than Harris Rd. This could cause significant problems in an emergency response situation.

Locke Rd, east of Mason Rd- Locke Brook overflows in times of heavy rain and is underwater, making it difficult to pass through this section of roadway.

Locke Rd, west of Hillside Dr- Beaver activity is blocking up the culvert causing occasional flooding. The highway department spends a lot of time trying to keep this culvert clear of debris. The homeowner to the south experiences occasional problems with their water well.

Locke Brook at Greenville Rd (Rt 31)- The beaver dam in this location is gone, but beaver activity has moved to the north and could potentially imapct the campground more.

Body of water, east of New Ipswich & Harris Rd- Beaver activity and damming has actually created this body of water.

Body of water, west of Greenville Rd & north of Foster Rd- Beaver activity and damming has actually created this body of water.

Communication/Fire Station- The communication station gets hit fairly frequently and interrupts service. As a result, they now have a spare antenna for use in the event of this occurrence. It should be noted that this has not happened in a long time but there is still a potential for the hazard to come to occur

Valley Road east of South Road- Heavy rain and snow melt is an issue in this area.

North of Townsend Rd, in the Willard Brook State Forest- Fieldstone blocks along the state park occasionally shift and come out of place. This occurrence is not frequent, but the potential exists for these blocks to land in the roadway. It should also be noted there is a retaining wall involved in this situation.

South Road near Ashby Reservoir- Heavy rain is an issue in this area.

A potential breach of the Ashby Reservoir Dam could have a domino affect on Damon Pond Dam, another High Hazard dam, potentially creating additional problems downstream. The potential exists to wash out several more roads, most notably Rt 119, heading into Townsend, with the possibility to affect several more homes.

Bottom of Kendall Hill at stream that crosses Route 31 (Fitchburg State Road).

Ashby Reservoir Dam- This dam is the jurisdiction of Fitchburg. A potential breach of this dam this dam would affect a significant area. Several roads would be flooded, most notable the intersection of Rt 119 & Rt 31. Also, the flooding would likely wash out the old wooden bridge that is the only access to the 4-H Club, and affect the 4-H Club itself. There are also a couple of homes that could be in the direct flow of water.

Richardson Rd, north of Upper Wrights Pond- Beaver activity in this area creates flooding/swamping that backs-up a home-owners septic system creating health problems. Beaver have been removed from the location within the last 5 years, but there is a recurring problem with the beaver returning.

Northeast corner of Lower Wrights Pond- Beaver activity and damming has caused flooding/swamping, occasionally creating sewer back-ups at the properties in this location. The beaver dam has been removed within the past 5 years, but there is still a recurring problem with the beavers returning.

Legend

- Community Boundaries

Roadways
- US & State Routes
- Other Roads

RailLines
- Active RailLines

Water
- Streams & Rivers
- Intermittent Stream
- Lakes, Ponds & Reservoirs

Local Hazards*
- Beaver Related
- Dam Related
- Erosion
- Thunderstorm Related
- Beaver Related
- Beaver Related
- Dam Related
- Erosion Related
- Heavy Rain

DATA SOURCES: MassGIS, MassDOT, the Town of Ashby and the MRPC. **DISCLAIMER**: The information depicted on this map is for planning purposes only. All data are representational and are not adequate for boundary definition, regulatory interpretation, or parcel-based analysis.

PREPARED BY:
Montachusett Regional Planning Commission
GIS Department, April 2014
1427R Water Street
Fitchburg, MA 01420
Phone: 978-345-7376
E-mail: mrpc@mrpc.org

0 0.5 1 2 Miles

*Local Hazard Data was derived from the Community Hazard & Vulnerability Session. This data is very approximate in nature, therefore it is not intended to depict exact locations of hazards, rather general areas where hazards may occur.

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Ashby, MA: FEMA Q3 Flood Zones

NEW IPSWICH, NH

MASON, NH

ASHBURNHAM

TOWNSEND

FITCHBURG

LUNENBURG

Legend

- Community Boundaries

Roadways
- US & State Routes
- Other Roads

RailLines
- Active RailLines

Water
- Streams & Rivers
- Intermittent Stream
- Lakes, Ponds & Reservoirs

FEMA Q3 Flood Zones*
- 100 Year**

DATA SOURCES: MassGIS, MassDOT, the Town of Ashby and the MRPC. **DISCLAIMER**: The information depicted on this map is for planning purposes only. All data are representational and are not adequate for boundary definition, regulatory interpretation, or parcel-based analysis.

PREPARED BY:
Montachusett Regional Planning Commission
GIS Department, June 2014
1427R Water Street
Fitchburg, MA 01420
Phone: 978-345-7376
E-mail: mrpc@mrpc.org

Montachusett Regional Planning Commission
Commonwealth of Massachusetts

FEMA Q3 Flood Zones:

* Special Flood Hazard Area (SFHA) boundary information conveyed by Q3 Flood Data files was developed to overlay USGS 7.5-minute topographic maps at a scale of 1:24,000. Thus, Q3 Flood Data cannot be assumed to have an accuracy of better than 40 feet. Due to other limitations, the Federal Insurance Administration (FIA) recommends that determinations using GIS technology and Q3 Flood Data generally be made only when structures are located 250 or more feet outside an SFHA boundary.

0 0.5 1 2 Miles

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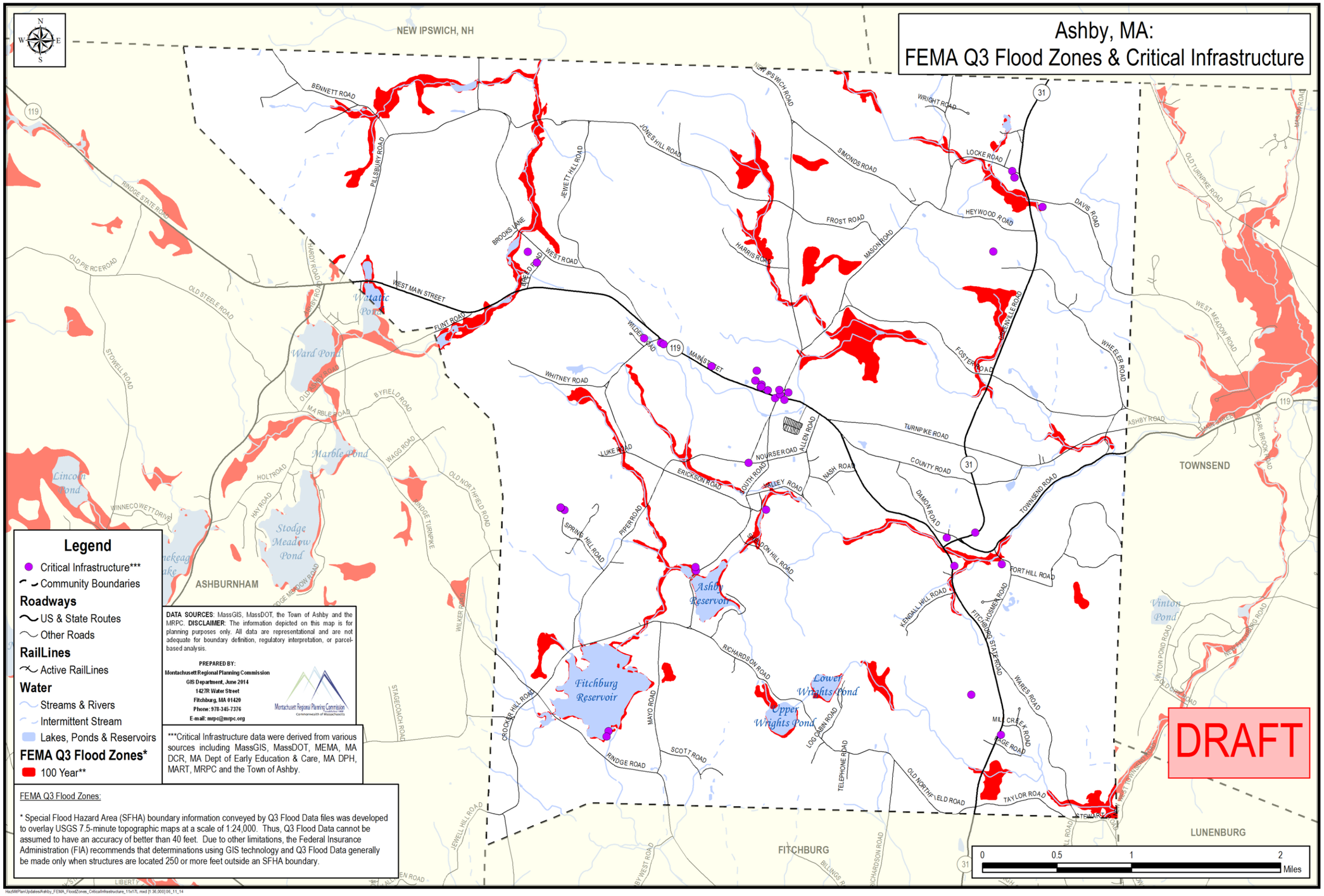
Ashby, MA:
FEMA Q3 Flood Zones & Critical Infrastructure



Legend

- Critical Infrastructure***
- Community Boundaries

Roadways
- US & State Routes
- Other Roads

RailLines
- Active RailLines

Water
- Streams & Rivers
- Intermittent Stream
- Lakes, Ponds & Reservoirs

FEMA Q3 Flood Zones*
- 100 Year**

DATA SOURCES: MassGIS, MassDOT, the Town of Ashby and the MRPC. **DISCLAIMER**: The information depicted on this map is for planning purposes only. All data are representational and are not adequate for boundary definition, regulatory interpretation, or parcel-based analysis.

PREPARED BY:
Montachusett Regional Planning Commission
GIS Department, June 2014
1427R Water Street
Fitchburg, MA 01420
Phone: 978-345-7376
E-mail: mrpc@mrpc.org

***Critical Infrastructure data were derived from various sources including MassGIS, MassDOT, MEMA, MA DCR, MA Dept of Early Education & Care, MA DPH, MART, MRPC and the Town of Ashby.

FEMA Q3 Flood Zones:

* Special Flood Hazard Area (SFHA) boundary information conveyed by Q3 Flood Data files was developed to overlay USGS 7.5-minute topographic maps at a scale of 1:24,000. Thus, Q3 Flood Data cannot be assumed to have an accuracy of better than 40 feet. Due to other limitations, the Federal Insurance Administration (FIA) recommends that determinations using GIS technology and Q3 Flood Data generally be made only when structures are located 250 or more feet outside an SFHA boundary.

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