Appendix 13: City of New Brunswick

The City of New Brunswick participated in the 2015 Middlesex County Hazard Mitigation Plan (HMP) update. This appendix includes the locally-specific information about the City. The following sections detail the planning process and participants; the current population, building stock, and land development trends; hazards that specific to the City and corresponding risk assessments; the City's mitigation strategy, and a local capability assessment.

1. Plan Development

On October 3, 2014, the Mayor signed an "Intent to Participate" letter and assigned the Assistant OEM Coordinator point of contact for the HMP update. The Assistant OEM Coordinator was also served on Hazard Mitigation Plan Steering Committee. This individual worked with other municipal employees, consultants, volunteers, and other stakeholders through the formation of a Local Planning Committee, as listed below. The local planning committee filled out the municipal worksheets included in Appendix E and worked to gather the necessary information to support the plan update.

Table 13-1: City of New Brunswick Local Planning Committee Members

Name	Title	Organization
Thomas E. Dobkowski	Deputy Chief	City of New Brunswick
R. Rawls	OEM Director	City of New Brunswick
Thomas Guldin	Floodplain Manager/City Engineer	City of New Brunswick
A. Caputo	Director of Police	City of New Brunswick
D. Wournell	Deputy Chief of Fire	City of New Brunswick
Steve Zarecki	Director of Public Works	City of New Brunswick
Glen Patterson	Director of Planning	City of New Brunswick
Douglas Petix	Chief Financial Officer	City of New Brunswick
William Shrum	Code Official	City of New Brunswick
Daniel A. Torrisi	Clerk	City of New Brunswick
Thomas A. Loughlin III	City Administrator	City of New Brunswick

2. Community Profile

2.1 Physical Location

The City of New Brunswick has a total area of 5.78 square miles and is located in the west-central region of Middlesex County, New Jersey. It sits adjacent to the Raritan River and is bordered by Highland Park, Edison and Piscataway across the river to the north, North Brunswick and East Brunswick to the southeast southwest, and Franklin Township, Somerset County to the west.

2.1.1 Hydrography and Hydrology

New Brunswick is located on the west bank of the Raritan River, within the Raritan River Basin. The river is tidal throughout this stretch as it flows to Raritan Bay. There are only two major tributaries within the City. Mile Run, which originates is the southwestern area of the City and flows north along the western boundary until it meets the Raritan. The Lawrence Brook flow from Westons Mill Pond to the Raritan along the City's eastern boundary. The Lawrence Brook is tidally influenced along this stretch, up to the dam at the pond. The Delaware and Raritan Canal originates in New Brunswick and runs adjacent to the Raritan River in the northern half of the City.

2.2 History and Governance

The City of New Brunswick was formally incorporated on September 1, 1784 from the land known as New Brunswick by Royal Charter. The City is governed under the Mayor-Council form of government, and has an elected Mayor and five Council members. The Mayor is elected directly to a four-year term of office. Town Council members are elected to serve four-year terms on a staggered basis, with two or three seats coming up for election every other year. Each month, the City Council holds meetings open to the public where it discusses legislation under consideration.

New Brunswick the County Seat for Middlesex County, and is known as the “Hub City” for its central location and access to major transportation networks in New Jersey. It is home to Rutgers University and the world headquarters of Johnson and Johnson. Two major hospitals, Robert Wood Johnson University Hospital and St. Peter’s University Hospital, along with the Bristol Myers-Squibb Children’s Hospital and Cancer Institute of New Jersey, creating a center of healthcare in the municipality.

2.3 Demographics

2.3.1 Population Trends

According to the U.S. Census Bureau, the population in 2010 was 55,181.[1] This is a 13.6% increase from 2000. The City of New Brunswick has a population density of 10,556.4 persons per square mile. It is the 2nd densest municipality within the County. New Brunswick has one of the largest Hispanic communities in New Jersey at almost 50% of the population. In addition, New Brunswick has a large

[1] U.S. Bureau of the Census. American Fact Finder “New Brunswick City, NJ”. http://factfinder.census.gov/ . Retrieved 9/4/15.

student population associated with Rutgers University. A summary of major population and household characteristics may be found in the following tables.

Table 13-2: City of New Brunswick Population Summary Estimates (2010 Census) [2]

Population	Quantity	Percent of Municipal Population
Total Population	55,181	100
Median Age	23.3	N/A
17 years and under	11,621	21.1
65 years and over	2,853	5.2
Race		
White	25,071	45.4
Black/African-American	8,852	16.0
Native American/Alaskan Native	498	0.9
Asian	4,195	7.6
Native Hawaiian/Pacific Islander	19	0.0
Other Race (unspecified)	14,122	25.6
Two or More Races	2,424	4.4
Hispanic or Latino	27,552	49.9

Population statistics may further reveal potential vulnerabilities in the community. The following table details the distribution of two groups included in vulnerable population analyses (children and the elderly) according to household description. Residents living alone, particularly the elderly, may have fewer coping mechanisms and resource than those in household groups, therefore may constitute a demographic that could require assistance in mitigating their vulnerability.

Table 13-3: City of New Brunswick Household Characteristics Summary Estimates (2010 Census) [3]

Households	Quantity	Percent of Total
Total Households	14,119	100
Family Households (related)	7,750	54.9
Family Households w children under 18	4,374	31.0
Non-Family Households (unrelated)	6,369	45.1
Non-Family Households, living alone	3, 647	25.8
Non-Family Households, living alone Male over 65 years	327	2.3
Non-Family Households, living alone Female over 65 years	684	4.8

2.3.2 Vulnerable Populations

Vulnerable populations include those groups that may require special assistance, considerations, accommodation or other needs during emergency events to facilitate their effective and safe compliance with emergency instructions. This includes, but is not limited to, those individuals needing mobility assistance (strollers, wheelchairs, etc.), those with financial needs (cannot afford hotel rooms,

[2] Ibid.
[3] Ibid.

food, necessities, during evacuation periods, etc.), those requiring translation or interpretation services to understand emergency information (non-English-speaking populations, Deaf and hard of hearing), persons considered legal minors, those persons with cognitive impairments, persons with specialized medical needs (electric dependent equipment, refrigerated medications, use of Personal Assistants for routine and basic care, medical transportation needs, etc.), and populations with social disadvantages other needs that may require unique considerations during emergency events.

Identifiable vulnerable populations in New Brunswick include (but may not be limited to) the following:

Table 13-4: City of New Brunswick Vulnerable Population Estimates (2010)

Population Type	Population Estimate (2010 Census)[4]
Under 5 years of age	3,954
Under 18 years of age	11,621
Over 65 years of age	2,853
Limited English Proficiency (LEP)	19,051 (equals 37.4% of population over 5 years old)
Institutionalized	182
Living in Group Quarters	7,563

There are a significant number of people in New Brunswick who claim limited English proficiency, which may have impacts for mitigating vulnerability at household and individual levels. In addition to these statistics, approximately 33.8% of the population has lived below the poverty line in 2013. The mean household income is $53,312, with the per capita income at approximately $14,660 (2013 estimates).[5]

2.4 Land Use and Development

Located on the King's Highway, the City of New Brunswick has been developed since the 1700s. As seen in Table 13-5, its land area is classified as close to 80 percent urban, which has not grown significantly between 2002 and 2012. This is an indication that the City has been largely built-out and will continue to see redevelopment opportunities instead of large new development projects. The City has seen significant redevelopment to support Rutgers, The State University of New Jersey, as well as Robert Wood Johnson University Hospital. This redevelopment has largely been at higher elevations within the City, and has not been built adjacent to known hazard areas.

2.4.1 Open Space

Most of the undeveloped land in the City has been dedicated as open space, including Boyd Park along the waterfront. The City has preserved about 300 acres of open space within its limit; approximately 100 of these acres are located in the Special Flood Hazard Area. This means that an estimated 36 percent of the City's floodprone land is already preserved.

[4] Ibid.
[5] U.S. Bureau of the Census. American Fact Finder "New Brunswick City, NJ". http://factfinder.census.gov/ . Retrieved 9/4/15.

Table 13-5: City of New Brunswick Land Cover Summary

Land Cover Class	Percent of Total Land[6]	2002 (acres)	2007 (acres)	2012 (acres)	Percent Change[7]
Agriculture	0.52%	31.47	33.16	19.32	-38.61%
Barren Land	0.41%	36.66	75.12	15.00	-59.09%
Forest	6.07%	249.29	221.94	223.90	-10.19%
Urban	78.77%	2839.45	2831.99	2903.67	2.26%
Water	9.54%	348.50	350.17	351.64	0.90%
Wetlands	4.69%	180.86	173.86	172.71	-4.50%

2.4.2 Buildings and Development

The City has an extensive history that pre-dates the Revolution. Its proximity to the Raritan River and Canal positioned the City as a premier locale for business development. Several buildings within the City are listed on the National Register of Historic Places and well as the State Register. Over 75 percent of the buildings in the City were built before 1979, though this number is likely to decrease in future years as redevelopment in the City progresses.

Table 13-6: City of New Brunswick Housing Statistics

Housing Characteristics	Estimate
Total Occupied Housing Units	13,920
Percent Owner-occupied	21.7
Percent Renter-occupied	78.3
Percent built after 2000	8.5
Percent built before 1979	75.4

2.4.3 Recent and Expected Development

Project Name	Type	Number of Structures	Locations	Known Hazards	Description/Status
The Aspire	Mixed Use	238 Units	135 Somerset St	None Known	completed
View	Mixed Use	150 Living Units	100 Somerset St	None Known	Complete
Wellness Center	Mixed Use		100 Kirkpatrick St	None Known	Cpomplete

[6] Percent based on acres of land in 2012
[7] Change is calculated between 2002 and 2012

Rutgers Univ. Lot 8	Mixed Use		46 College Ave		Under Construction
Matrix	Residental	393 Units	Neilson St		Under Construction

2.5 Critical Facilities and Infrastructure

2.5.1 Essential Facilities

The City operates several buildings for its municipal functions including City Hall, Fire Department Headquarters, two firehouses, a public library, and the Department of Public Work, Senior citizen building and Public safety Building (Police Headquarters & Inspections). Facilities that are used for warming and cooling station are the Public Library and the Senior Center they are used during normal working hours.

There is no generator back up at City Hall, Public Library, Raw Water Pump Station at Weston Mill.

Fire Headquarters, Engine Company 2 Station, Engine Company 5 Station are in the process of installing generator back up.

None of these facilities are in a known hazard area and have not experienced significant flood damage in any past event. City Hall did experience wind damage to its roof during Irene.

2.5.2 Transportation

Primary transportation routes include Route 1, Route 18, and Route 27, and the New Jersey Turnpike is accessible via Exit 9 in East Brunswick, off Route 18. New Jersey Transit provides bus service and there are two rail stations that provide services on the Northeast Corridor Line.

2.5.3 Critical Utilities and Infrastructure

The City of New Brunswick operates its own water utility and maintains the wastewater infrastructure throughout the City. The City operates a water treatment plant and a pumping station. The pump station is adjacent to Weston's Mill Pond and did experience damage in Irene from overtopping. The Middlesex County Utilities Authority is responsible for wastewater treatment from the city, but the Department of Public Works is responsible for the maintenance and cleaning of the sewer system. Natural Gas and Electricity are serviced by PSE&G. The City is in the process of installing generators at the raw water Pump Station at the canal and an additional generator at the water filtration plant.

3. Hazard Identification and Risk Assessment

This section describes the natural hazards and risks that can affect the City of New Brunswick Like all the other municipalities in Middlesex County, New Brunswick is potentially subject to the effects of all the hazards that are considered in this mitigation plan. However, only a few of these hazards have significant impacts that are unique to the community. The remaining hazards are discussed in detail in the County part of this mitigation plan. FEMA mitigation planning guidance requires that County

mitigation plans include a risk assessment section that "assess[es] each jurisdiction's risks where there vary from the risks facing the entire planning area" (44CFR 201.6 (c) (2) (iii). Because the Middlesex County HMP update includes separate appendices for each municipality, this requirement is met in the appendices, while risks that affect the entire County uniformly are discussed in the County part of the HMP.

3.1 Background and Hazard Rankings

One of the first steps in developing jurisdictional appendices was for participating municipalities to review and prioritize the hazards that can affect them. This was done based on how often a hazard has occurred, how significant effects have been in the past, the difficulty and cost of recovering from such events. Municipalities ranked the list of hazards as high, medium, low, or no concern.

Table 13-7 shows community hazard rankings. To the extent possible, the level of discussion and detail about specific hazards in this section are based on these rankings. However, in many cases there is insufficient hazard information available at the level of the jurisdiction to allow detailed discussion or risk estimates. For some hazards there is limited jurisdiction-level tabular data included in the County portion of the HMP, and users should refer to those subsections for more detail. The hazards marked with asterisks in the table above are included in this appendix; the others are included in the County portion of this HMP, but not discussed in detail here.

Table 13-7
City of New Brunswick
Hazard Identification and Prioritization

Hazard	Priority
Coastal Erosion	Low
Dam/Levee Failure	Low
Drought	Low
Earthquakes	Low
Extremely High Temps	Medium
Extremely Low Temps	Medium
Floods	Medium
Hurricanes/Tropical Storms	High
Nor'easters	High
Power Outages	High
Severe Weather	High
Hazardous Substances	Medium
Wildfire	Low
Winter Storm	High

3.2 Flood Hazard

3.2.1 Type, Location, and Extent

The City of New Brunswick is located in west-central Middlesex County. The Raritan River forms the northern border of the jurisdiction. Other than the Raritan, the only potential source of flooding in New Brunswick is a relatively small stream called Mile Run that meanders across the southern part of the jurisdiction, then north to drain into the Raritan. Nearly all the floodplain in the City is related to the Raritan.

One of the best resources for determining flood risk in a jurisdiction is Flood Insurance Rate Maps (FIRMs), which are produced by FEMA. The FIRM is the official map of a community on which FEMA has delineated both the special flood hazard areas (1% annual chance of flooding) and the risk premium zones applicable to the jurisdiction. At the time the Middlesex County HMP was being updated, the effective FIRM for the City of New Brunswick is dated July 6, 2010. While the effective FIRM is the approved map and is used for regulatory purposes, the Middlesex County hazard mitigation plan update was developed in 2015, and the best available flood mapping at that time was the FEMA revised Preliminary Flood Map (released on January 30, 2015). This map is shown below in Figure 13-1. It clearly shows that nearly all the 100- and 500-year floodplain in the jurisdiction is related to the Raritan.

As shown in Table 13-8 below, although a relatively large part of the jurisdiction is in the floodplain, there is little or no development in these areas.

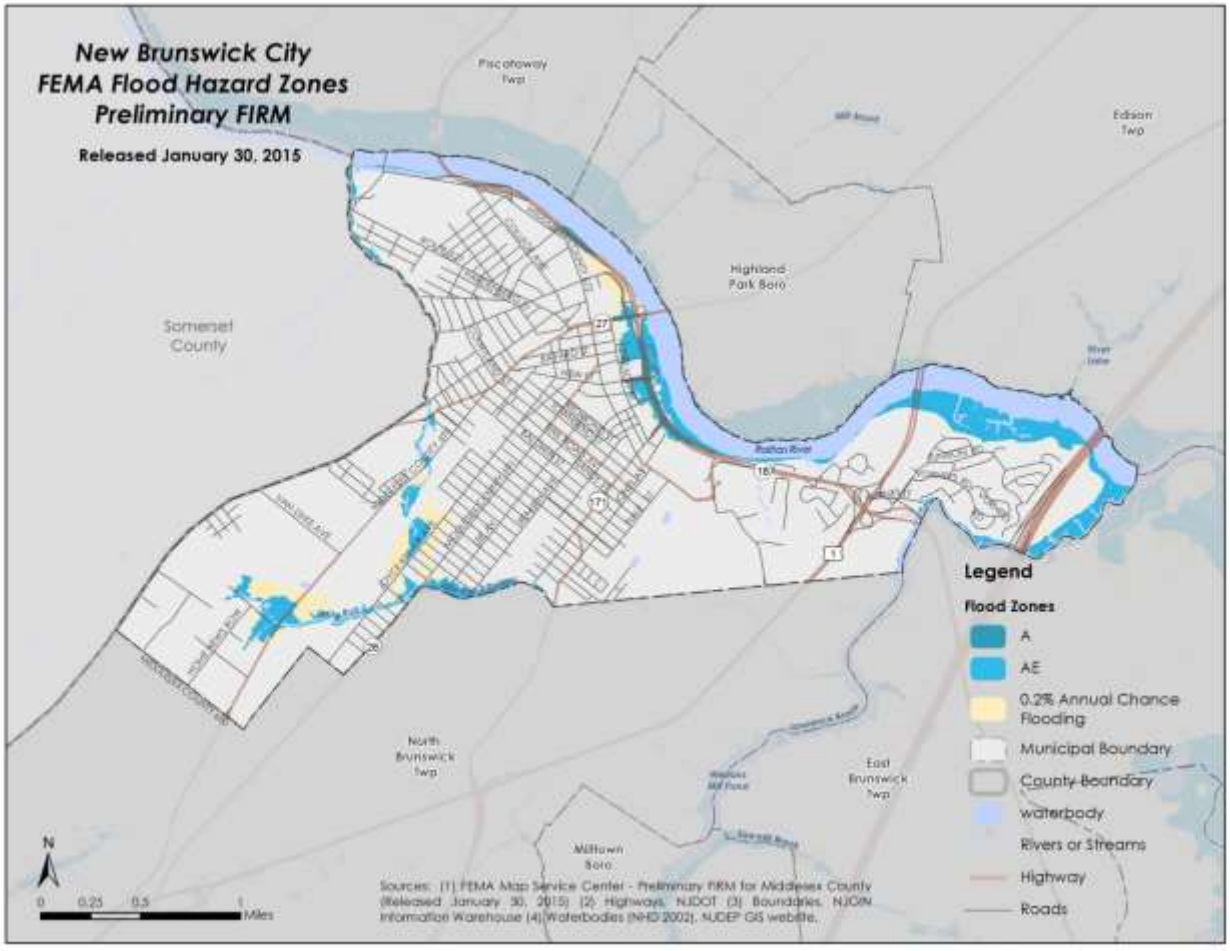
Table 13-8
Floodplain and Parcel Data for the City of New Brunswick
(Source: FEMA Region II, Coastal Analysis and Mapping, Preliminary FIRM, January 2015)

Data Type	Value
Jurisdiction area in square miles	5.75
Square miles within 100-year floodplain	0.99
Jurisdiction area within 100-year floodplain	17.27%
Number of parcels in jurisdiction	7,828
Number of parcels with centroids within 100-year floodplain	111
Parcels with centroids within 100-year floodplain	1.42%

[Note: the table refers to centroids, which are the geographic center of a parcel. This is a better indicator of flood exposure than simple intersection with the floodplain, although it does not necessarily mean that any structures or infrastructure are within the boundaries of the Special Flood Hazard Area]. Current FEMA guidance uses the term *extent* as analogous to potential severity. Because of the exposure to the Raritan, the extent of the flood hazard in New Brunswick is significant, particularly along the river's west/south banks. However, floodprone areas are largely reserved as open space and parks, and there is a significant elevation gain moving west and south away from the river, so potential depths (extent) are much less in developed areas. Route 18 parallels the river in this area, and as shown below,

it does flood occasionally during major rain events, closing the route to traffic.

Figure 13-1
New Brunswick portion of FEMA Revised Preliminary Flood Insurance Rate Map
(Source: FEMA Region II, Coastal Analysis and Mapping, Preliminary FIRM, January 2015)



3.2.2 Previous Occurrences and the Probability of Future Floods

Table 13-9
NFIP Policies and Claims

Number of Parcels:	
New Brunswick:	7,828
Middlesex County:	283,276
Number of Policies In-Force:	
New Brunswick:	70
Middlesex County:	4,489
Number of Claims:	
New Brunswick:	40
Middlesex County:	3,478
Total Paid Claims	
New Brunswick:	$1,734,058
Middlesex County:	$109,727,837

As noted above, most of the flooding in this jurisdiction is related to overbank events on the south side of the Raritan River, as well as Mile Run, where the stream comes in close proximity to Livingston Avenue in the southern part of the jurisdiction. There have been a few significant events in the past, although they have resulted in relatively little damage. A review of NFIP claims records indicates that Tropical Storm Irene (2011) likely has caused the most flood damage in the past, with the majority

3.2.3 Flood Impacts and Vulnerabilities to Flooding

The impacts from past floods in this jurisdiction have been moderate in nature. As discussed below, a few specific properties have dominated the NFIP insurance claims data, suggesting that vulnerabilities to flooding in New Brunswick are not widespread. More than half the claims in this community were related to Tropical Storm Irene in 2011, with the remainder spread over various dates and events. This suggests that vulnerabilities in the community are related to relatively unlikely events, as opposed to flooding occurring during ordinary rainstorms.

3.2.4 National Flood Insurance Program and Repetitive Loss Properties

To provide a sense of the flood risk in a community it is also beneficial to summarize the policies in force and claims statistics from the National Flood Insurance Program (NFIP). There is a discussion of the NFIP in the County section of this hazard mitigation plan. New Brunswick has been a member of the NFIP since 1979.

FEMA NFIP statistics indicate that as of February 2014, federal flood insurance policies were in-force on 70 properties in New Brunswick. Between 1978 and 2014, there have been a total of 40 NFIP insurance claims in the community, with a total claims value of $1,734,058.[8] Table 13-9 compares the number of policies in-force and paid claims in the jurisdiction. The Table shows that New Brunswick comprises 1.6% of the NFIP policies in-force in Middlesex County. Notably, the average NFIP claim in New Brunswick ($43,351) is significantly more than the overall County, which is $31,549. A review of the claims database shows that a few large claims on several properties greatly increase the overall average.

New Brunswick is not presently a member of the Community Rating System (CRS), a voluntary program for communities participating in the NFIP. The CRS is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements.

[8] FEMA – Policy and Claim Statistics for Flood Insurance

For CRS participating communities, flood insurance premium rates are discounted in increments of 5% based on creditable activities.[9] CRS communities are ranked between 1 and 10, with Class 1 communities receiving a 45% premium discount.

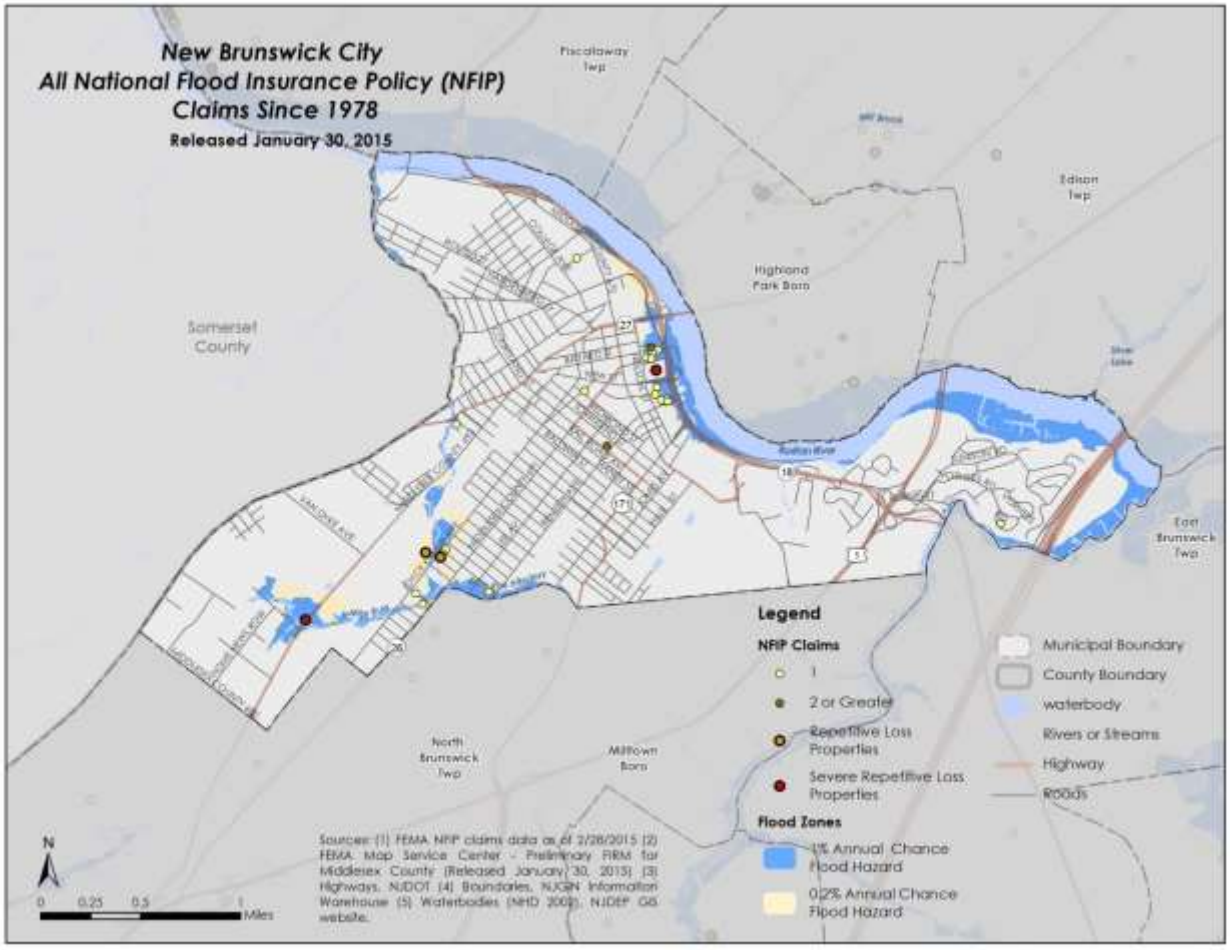
It should be noted that NFIP claims are not a direct or completely accurate proxy for flood risk in a community. The data does not include flood damages to structures that had no flood insurance. Also, in some cases, structures or contents may have been underinsured. The NFIP claims data also does not include any damages to public facilities, which may be insured via other means (such as self-insurance or non-FEMA policies); such damages may also be addressed through other federal programs such as FEMA's Public Assistance Program.

Figure 13-2 shows all NFIP claims in New Brunswick between 1978 and 2014. The majority of flood insurance claims are found in the area immediately south of Memorial Parkway, and are related to overland flow and ponding from Tropical Storm Irene, in 2011.

Figure 13-2
Photo of Boyd Park after Hurricane Irene
(Source: Associated Press, September 2011)

[9] FEMA – Community Rating System (CRS).

Figure 13-2
Map of NFIP Claims in the City of New Brunswick (1978 to 2015),
Including Repetitive Loss and Severe Repetitive Loss Properties
(Source: FEMA National Flood Insurance Program, February 2015)



3.2.5 Flood Risk to Repetitive Loss Properties in New Brunswick

FEMA requires a discussion of NFIP Repetitive Loss and Severe Repetitive flood loss statistics in hazard mitigation plans. A repetitive loss property is a structure covered by a contract for flood insurance made available under the NFIP that has incurred flood-related damage on two occasions, in which the cost of the repair, on average, equaled or exceeded 25% of market value of the structure at the time of each such flood event.

The flood risk assessment in this section is based in part on analysis of NFIP data on repetitive flood loss properties. As of February 2015, Middlesex County had 429 such properties based on a query of the FEMA BureauNet NFIP interface. (Note that the data about Repetitive Loss properties in this subsection are based on the previous definition. Under the revised definition, Middlesex County has 47 RL properties, and New Brunswick has no RL properties.)

Table 13-10
NFIP Policies and Claims

Repetitive Loss (RL) Properties:	
New Brunswick:	4
Middlesex County:	429
Total Building (RL)	
New Brunswick:	$862,936
Middlesex County:	$44,015,885
Total Contents (RL)	
New Brunswick:	$11,833
Middlesex County:	$5,106,609
Number of Claims (RL)	
New Brunswick:	13
Middlesex County:	1,322
Average Claim (RL)	
New Brunswick:	$67,290
Middlesex County:	$37,158
Severe Repetitive Loss (SRL) Properties:	
New Brunswick:	2
Middlesex County:	77
Total Building (SRL)	
New Brunswick:	$720,411
Middlesex County:	$14,512,761
Total Contents (SRL)	
New Brunswick:	$697
Middlesex County:	$910,122
Number of Claims (SRL)	
New Brunswick:	9
Middlesex County:	385
Average Claim (SRL)	
New Brunswick:	$80,123
Middlesex County:	$40,059

Of this total, four properties were located within New Brunswick; this comprises less than one percent of the County total. Table 13-10 provides a comparison of the residential repetitive loss claims for Middlesex County and New Brunswick. The tables below include the number of repetitive loss properties, building and contents damages, the total number of claims, and the average claim amounts.

The four repetitive loss properties in New Brunswick were responsible for a total of 13 insurance claims, totaling $862,936. Table 13-11 provides summary repetitive loss statistics for the community. Although the community includes a very small percentage of repetitive loss properties, the average claim is more than twice the size of the County average, suggesting high flood depths (and perhaps other factors) on some or all of the RL properties.

Table 13-11
Repetitive Loss Statistics in the City of New Brunswick and Middlesex County
(Source: FEMA National Flood Insurance Program, February 2015)

City/County Name	Properties	Total Building	Total Contents	Total Losses	# of Claims	Average Claim
City of New Brunswick	4	$862,936	$11,833	$874,769	13	$67,290
Middlesex County	429	$44,015,885	$5,106,609	$49,122,494	1,322	$37,158

The next table provides the results of a simple risk projection for repetitive loss properties. This is done by annualizing past insurance claims and using this as the basis for estimating future losses. This method employs standard FEMA statistical techniques, and may be used for developing a sense of flood risk, i.e. total future losses over the 100-year planning horizon. The results below should be considered general and preliminary. It is possible to complete more accurate risk assessments for specific projects using FEMA software and methodologies, combined with information about sites and facilities.

Figure 13-12
100-Year Risk Projection for NFIP Repetitive Loss Properties in the City of New Brunswick

Data	Value
Period in years	14
Number of claims	13
Average claims per year	0.93
Total value of claims	$874,769
Average value of claims per year	$62,483
Projected risk, 100-year horizon	**$891,639**

3.2.6 Flood Risk to Severe Repetitive Loss Properties in New Brunswick

The definition of Severe Repetitive Flood Loss is included in the County portion of this mitigation plan. As of February 2014, New Brunswick had two properties that fall under this definition, and all of Middlesex County had 112. Table 13-13 provides basic information about the SRL properties in this jurisdiction. (Note that under the revised definition of Severe Repetitive Loss, the County now has 106 such properties, and New Brunswick, two.) SRL properties are also shown graphically in Figure 13-2 (ref the combined NFIP map) above.

Table 13-13
Statistics on NFIP Severe Repetitive Loss Properties in the City of New Brunswick
(Source: FEMA National Flood Insurance Program, February 2015)

City/County Name	Properties	Total Building	Total Contents	Total Losses	# of Claims	Average Claim
City of New Brunswick	2	$720,411	$697	$721,107	9	$80,123
Middlesex County	77	$14,512,761	$910,122	$15,422,883	385	$40,059

The next table shows the results of a simple risk (future losses) projection for severe repetitive loss properties. This is done by annualizing past losses and using this as the basis for estimating future losses. This method uses standard FEMA techniques, and may be used for developing a sense of flood risk. The results below should be considered general and preliminary. It is possible to complete more accurate risk assessments for specific projects using FEMA software and methodologies.

Figure 13-14
100-Year Risk Projection for NFIP Severe Repetitive Loss Properties in the City of New Brunswick

Data	Value
Period in years	14
Number of claims	9
Average claims per year	0.64
Total value of claims	$721,107
Average value of claims per year	$51,508
Projected risk, 100-year horizon	**$735,015**

3.3 Hurricanes and Tropical Storms

Based on input from the hazard ranking process, New Brunswick considers hurricanes and tropical storms significant hazards, and thus there is a short discussion in the present subsection.

3.3.1 Wind Risk Estimates

There are three significant hazards related to hurricanes, tropical storms, and to a lesser extent, nor'easters. These are: floods, storm surge, and high winds. Both floods and storm surge are addressed in the flood section of this appendix, as well as Section 5 of the Plan update. This subsection provides a preliminary quantification of hurricane wind risk based that was generated by FEMA's HAZUS-MH software (version 2.1, 2014). The calculations in Table 13-15 show a range of loss categories across the top row versus "occupancy classes" on the first column. The occupancy classes are various land uses that are represented in HAZUS. The last two columns indicate the projected 50-year and 100-year risks, i.e. the total amount of damage over those planning horizons. The figures are based on annualizing losses, then discounting them to present value using the software. There is more detailed information about the calculations and County-wide results in the main section of this HMP update.

Table 3-15
Probabilistic Wind Risk in New Brunswick 50- and 100-year Planning Horizons
(Source: FEMA, HAZUS-MH version 2.1)

Occupancy Class	Total SF	Building Damages	Contents Damages	Inventory Loss	Relocation Cost	Business Income Loss	Rental Loss	Lost Wages
Residential	18,095,192	$324,600	$57,350	$0	$20,032	$60	$19,967	$141
Commercial	5,467,592	$43,577	$20,062	$325	$7,026	$5,132	$3,372	$6,791
Industrial	2,952,630	$19,467	$13,861	$1,910	$1,374	$224	$243	$370
Agricultural	21,213	$147	$73	$9	$23	$1	$1	$0
Religious	589,615	$4,734	$1,563	$0	$658	$361	$58	$849
Government	333,824	$2,128	$1,054	$0	$469	$21	$114	$2,226
Education	693,697	$4,885	$2,711	$0	$984	$291	$74	$684
Totals	**28,153,761**	**$399,537**	**$96,674**	**$2,243**	**$30,565**	**$6,090**	**$23,829**	**$11,061**

Table 3-16
Probabilistic Wind Risk in New Brunswick 50- and 100-year Planning Horizons
(Source: FEMA, HAZUS-MH version 2.1)

Total Annualized Loss	50-year Risk	100-year Risk
$422,151	$5,826,100	$6,023,666
$86,285	$1,190,817	$1,231,198
$37,447	$516,811	$534,336
$254	$3,503	$3,622
$8,222	$113,476	$117,324
$6,013	$82,990	$85,804
$9,629	$132,890	$137,396
$570,001	**$7,866,586**	**$8,133,346**

3.3.2 FEMA Project Worksheets from Tropical Storm Irene and Hurricane Sandy

Following many natural disasters, FEMA engineers and field teams complete formal assessments of damage to community assets, and document these in project worksheets (PWs). The PWs are the basis of FEMA Public Assistance grants for repairs. There are seven categories of damage, indicated by the letters A through G. These are: A – debris removal; B – emergency protective measures; C – roads and bridges; D – water control facilities; E – public buildings; F – utilities, and; G – recreational facilities/other. The categories and amounts of the PWs are listed in Table 3-16 below for Tropical Storm Irene and Hurricane Sandy. Note that in some cases there are multiple different organizations in a community that are applicants for FEMA Public Assistance. In order to simplify the table, the PW amounts for all applicants in a community are combined.

Table 3-17
FEMA Public Assistance Expenditures in Tropical Storm Irene and Hurricane Sandy, by Category
(Source: FEMA Region II, Public Assistance)

Event Name/Public Assistance Category	A	B	C	D	E	F	G	Total
Tropical Storm Irene	$76,652	$229,572	$0	$98,166	$2,629	$0	$0	$407,019
Hurricane Sandy	$416,997	$1,530,000	$11,980	$0	$1,000	$1,000	$0	$1,960,977
Total	**$493,649**	**$1,759,572**	**$11,980**	**$98,166**	**$3,629**	**$1,000**	**$0**	**$2,367,996**

4. Capability Assessment

Each community within the planning area has a unique set of capabilities and priorities that affect its mitigation strategy. The following tables detail the capabilities assessed for the City of New Brunswick during this plan update.

4.1.1 Planning and Regulatory

Tool / Program (code, ordinance, plan)	(Yes/No)	Code Citation and Comments
Master Plan	Yes	
Capital Improvements Plan	Yes	
Floodplain Management / Basin Plan	No	
Stormwater Management Plan	Yes	Title 16.24.270A
Open Space Plan	No	
Stream Corridor Management Plan	Yes	NJDEP Stream Encroachment Regs.
Watershed Management or Protection Plan	No	
Economic Development Plan		
Comprehensive Emergency Management Plan	Yes	
Emergency Operation Plan	Yes	
Post-Disaster Recovery Plan	No	
Transportation Plan	No	
Strategic Recovery Planning Report		
Zoning Ordinance	Yes	Title 17
Subdivision Ordinance	Yes	Title 16
NFIP: Cumulative Substantial Damages		
Growth Management Ordinances	No	
Site Plan Review Requirements	Yes	Title 16
Stormwater Management Ordinance	Yes	Title 16.24.270A
Municipal Separate Storm Sewer System (MS4)	Yes	
Combined Sewer Overflows (CSO)	No	
Natural Hazard Ordinance	No	
Post-Disaster Recovery Ordinance	No	
Real Estate Disclosure Requirement	No	
Other [Special Purpose Ordinances (i.e., sensitive areas, steep slope)]	Yes	Steep slope, riparian zone, waterfront conservation

4.1.2 Staff/Personnel

Resources	Is this in place? (Y/N)	Department/ Agency/Position
Planning Board	Yes	Planning Board
Mitigation Planning Committee		
Environmental Board/Commission	Yes	Environmental Commission
Open Space Board/Committee		
Economic Development Commission/Committee	Yes	Planning & Economic Development Dept
Maintenance Programs to Reduce Risk		
Mutual Aid Agreements	Yes	Fire

Resources	Is this in place? (Y/N)	Department/ Agency/Position
Planner(s) or Engineer(s) with knowledge of land development and land management practices	Yes	Planning, Engineering
Engineer(s) or Professional(s) trained in construction practices related to buildings and/or infrastructure	Yes	Engineering, Construction Code Official
Planners or engineers on staff with a strong understanding of natural hazards	Yes	Engineering
NFIP Floodplain Administrator	Yes	Engin
Surveyors	No	
GIS layers and maps	Yes	Eng
Personnel trained in GIS	Yes	Tax Assessor
Personnel trained in HAZUS		
Emergency Manager	Yes	OEM
Grant Writer	No	
Staff with expertise in cost/benefit analysis	No	
Professionals trained in conducting damage assessments	Yes	Eng/Inspections

4.1.3 Education/Outreach and Community Classifications

Program	Do you Participate in/Use this Program (Yes/No)	Classification (if applicable)	Date Classified (if applicable)
Community Rating System (CRS)	No		
Building Code Effectiveness Grading Schedule (BCEGS)			
Public Protection (ISO Fire Protection Classes 1 to 10)	Yes	3	Aug 29,2013
Storm Ready	No		
Firewise			
Disaster/Safety Programs in/for Schools	Yes		
Organizations with Mitigation Focus (advocacy group, non-government)	No		
Public Education Program/Outreach (through website, social media)	No		
Public-Private Partnerships	No		

4.1.4 Fiscal Capabilities

	Yes/No
Do you have a line item in your operating budget for mitigation project funding?	No
If no, will you look at mitigation actions when allocating funding in the future?	
Do you have a line item in the Capital Improvement Budget for mitigation project funding?	No
Have you provided funding for mitigation projects identified in the hazard mitigation plan?	Yes
Does your town have the authority to Levy Taxes for specific purposes?	
Does your town have user fees for water, sewer, gas or electric service?	Yes
Do you impose impact Fees for homebuyers or developers of new development/homes?	No
Does your community have an open space acquisition fund?	No
Do you use bonds to finance projects (general obligation bonds, special tax bonds, private activity bonds)	Yes

5. Mitigation Strategy

This section describes what projects, initiatives, and other actions the City has undertaken or plans to implement to reduce risk and loss within its jurisdiction. This includes the status of previously identified actions and any other projects that have been completed since the 2010 Plan was adopted. The additional actions were determined by the LPC based on self-determined priorities and experience.

5.1 Past Mitigation Actions

The table below lists the mitigation projects and actions that were included in the original 2010 Plan.

Mitigation Action	Responsible Party	Status	Review Comments
New Brunswick 1: Feasibility study for drainage at Verizon Tandem Office(9-1-1 switch for eastern seaboard)	New Brunswick OEM	Incomplete due to lack of funding	

5.2 Other Mitigation Activities

The City secured generators for fire department and the water utility through the HMGP.

5.3 Proposed Mitigation Actions

The table below details the mitigation initiatives the City of New Brunswick would like to pursue to minimize future effects of hazard events. These actions have been determined through a local assessment of current risk and needs. The LPC met with the Plan Consultant to review all hazard and risk assessment data and evaluate the strategy. These initiatives are dependent upon funding and may change based on municipal priorities and future hazard events.

For each new mitigation action, the City has ranked as 'High', 'Medium', or 'Low', based on the evaluation criteria outlined in Section 5.

Proposed Action	Anticipated Benefits	Responsible Party	Funding or Implementation Mechanism	Timeline	Priority
Improve Charles St Culvert	Flood Mitigation	Middlesex Cty	County Capital	2016-2017	High
Improve Triangle Rd Culvert	Flood Mitigation	Middlesex Cty	County Capital	2017-2018	High

Commercial Ave Storm water upgrades	Flooding	New Brunswick	Capital Funds	2016	Medium
Mitigate repetitive loss properties	Flooding	New Brunswick	Grants	2017-2020	High
Install generators in City Hall, Public Library, Senior Center to maintain normal operations.	All	New Brunswick	Grants/Capital Funds	2016-2018	High

6. Plan Implementation

The LPC shall document, as needed and appropriate:

- Hazard events and losses in New Brunswick and the effects that mitigation actions have had on impacts and losses,
- Progress on the implementation of mitigation actions, including efforts to obtain outside funding for projects,
- Any obstacles or impediments to the implementation of actions,
- Additional mitigation actions believed to be appropriate and feasible,
- All public and stakeholder input and comment on the Plan that has been received by the City.
- Copies of any grant applications filed on behalf of the City

Continued Public Input

The City of New Brunswick is committed to incorporating public input into its ongoing hazard mitigation planning. The public will have an opportunity to comment on the Plan prior to any changes and during the 5-year plan update. The annual progress reports will be posted on the County mitigation website in addition to the adopted Plan.

All public comments and input on the plan will be recorded and addressed, as appropriate. Opportunity to comment on the plan will be provided directly through the County's website. Public comments can also be submitted in writing to the County's HMP Coordinator. All public comments shall be addressed to: Middlesex County Office of Emergency Management c/o All Hazards Pre-disaster Mitigation Plan Coordinator, 1001 Fire Academy Drive, Sayreville, NJ 08872.

The City of New Brunswick's LPC shall ensure that:

- Copies of the latest approved Plan are available for review at City Hall along with instructions to facilitate public input and comment on the Plan.
- Public notices are made as appropriate to inform the public of the availability of the Plan, particularly during Plan update cycles.
- For minor changes to this appendix, the City of New Brunswick will post a notice on the City's website and invite the public to review and comment.
- For major changes involving City Council approval, the City will use its standard public notice procedures inviting the public to review the document and provide feedback.

Plan Adoption

On [insert date] Middlesex County submitted the initial draft of the 2015 Plan Update to NJOEM for review and comment. After addressing NJOEM comments in the document, the HMP was resubmitted for final consideration and approval by NJOEM and FEMA. FEMA approved the plan on [insert date],

and the Plan update was forwarded to the Middlesex County Board of Chosen Freeholders for adoption, which occurred on [insert date].

The City Council approved the plan on [insert date]. The City resolution for adoption is provided below, the County's adoption resolution is provided as Appendix F of the 2015 HMP update. Following adoption, the plan update was resubmitted to FEMA for final approval, which occurred on [insert date]. The FEMA approval letter is included as Appendix G.

Plan Maintenance

The City of New Brunswick will review this Appendix of the County's hazard mitigation plan appendix each year and give the County's HMP Coordinator an annual progress report. The Emergency Management Coordinator is responsible for convening the LPC, initiating the plan review, and submitting the annual progress report. The LPC may use worksheets #1 and #3 in the FEMA 386-4 guidance document, to facilitate the review and progress report. FEMA guidance worksheets are provided in Appendix H. Local progress reports shall be provided to the County HMP Coordinator at least two weeks prior to the annual plan review meeting.

Additionally, the LPC will convene and review the plan when major hazard events impact the jurisdiction, potentially yielding opportunities for mitigation grant funding, or when new information suggests that plan elements do not accurately reflect the community's risk or its mitigation priorities.

If necessary, the Emergency Management Coordinator will convene a meeting of the LPC to review and approve all changes. The City retains the discretion to implement minor changes to the document without formal procedures involving the City Council subject to local policies and regulations.

In addition to the annual progress report, the City of New Brunswick will provide Middlesex County with a copy of the written notice of any changes to the jurisdictional appendix at the time such changes are implemented.