Town of Coventry, Rhode Island
2024 Hazard Mitigation and Floodplain Management Plan Update- DRAFT RISK ASSESSMENT

Adopted by the Town Council: date

Dates Active: date, 2024 – date, 2029

Prepared for:

Town of Coventry, RI

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FAIRWEATHERSCIENCE

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Acronyms/Abbreviations

BF	Brushfire
BRIC	Building Resilient Infrastructure and Communities
CC	Climate Change
CEMA	Coventry Emergency Management Agency
CF	Critical Facility
CFR	Code of Federal Regulations
ClimRR	Climate Risk and Resilience Portal- Argonne National Laboratory
CMI	Crop Moisture Index
CRS	Community Rating System
DF	Dam Failure
DMA 2000	Disaster Mitigation Act Of 2000
DT	Drought
EC4	Rhode Island Executive Climate Change Coordinating Council
EF Scale	Enhanced Fujita Scale
EQ	Earthquake
EXT	Extreme Temperatures
FEMA	Federal Emergency Management Agency
FL	Flooding
FMA	Flood Mitigation Assistance Program
g	gravity
HAZUS-MH	HAZUS-Multi Hazard GIS tool from FEMA
HHPD	High Hazard Potential Dam
HL	Hail
HM&FMP	Hazard Mitigation and Floodplain Management Plan
HMA	Hazard Mitigation Assistance
HMGP	Hazard Mitigation Grant Program
HMP	Hazard Mitigation Plan
MAP	Mitigation Action Plan
MMI	Modified Mercalli Intensity Scale
mph	miles per hour
MRP	Municipal Resiliency Workshop
NCEI	National Centers for Environmental Information
NFIP	National Flood Insurance Program
NOAA	National Oceanic and Atmospheric Administration
NWS	National Weather Service
PGA	Peak Ground Acceleration
RIDEM	Rhode Island Department of Environmental Management
RIEMA	Rhode Island Emergency Management Agency
RIIB	Rhode Island Infrastructure Banks
Stafford Act	Robert T. Stafford Disaster Relief and Emergency Assistance Act
STS	Severe Thunderstorm (High Wind, Lightning, Hail)
SWW	Severe Winter Weather (Snow Storm, Ice Storm)
T/EXTS	Tropical and Extratropical Storms (Hurricane and Nor'easter)
TO	Tornado
Town	Town of Coventry, Rhode Island
USGS	United States Geologic Survey

EXECUTIVE SUMMARY

The 2024 Town of Coventry, Rhode Island Hazard Mitigation and Floodplain Management Plan (HM&FMP) is a product of the Town of Coventry Emergency Management Agency (CEMA) Planning Team.

The purpose of hazard mitigation planning is to reduce or eliminate long-term risk to people and property from natural hazards. This plan was prepared following the requirements of the Disaster Mitigation Act of 2000 (DMA 2000) so that the Town would be eligible for FEMA's Hazard Mitigation Assistance (HMA) grant programs and other federal programs.

The CEMA Planning Team's overview of past natural hazard events verifies that the Town is still vulnerable to diverse natural hazards including severe thunderstorm (high wind, lightning, hail), dam failure, flooding, riverine erosion, tropical and extratropical storms (hurricane and Nor'easter), severe winter weather (snow storm and ice storm), brushfire, drought, extreme temperatures, tornadoes, and earthquake. This Plan provides a description of the hazard, historical events, vulnerable locations, the extent (magnitude and severity) of the hazard, past and potential impacts of events, probability of future occurrence, and information on how climate change is influencing the hazard and its impacts to future populations and land use.

In recognition of the Town's current and projected vulnerability to flooding, the Town opted to intensify their focus on flooding within this HMP Update. Further, as the Town is in the process of participating in FEMA's Community Rating System (CRS) program, it was advantageous to integrate CRS Activity 510 - Floodplain Management Planning into the HMP Update.

As such, this document was developed according to the FEMA's updated Local Mitigation Planning Guidance and the CRS Activity 510 Planning Process into a single plan that meets the goals, intent, and requirements of each program.

The risk assessment portion of the Plan confirms that the Town has many assets vulnerable to natural hazard events. Some vulnerable assets include government, emergency response, medical, educational, utility, community, and vulnerable populations facilities as well as High and Significant hazard dams.

The CEMA Planning Team reviewed and reaffirmed the following goals from the 2018 HMP for the 2024 HM&FMP Update:

1. Implement actions which protect the lives and property of the Town of Coventry's residents.
2. Implement actions which protect the Town of Coventry's critical facilities and infrastructure.
3. Implement actions which protect the Town of Coventry's cultural, historical, natural and economic resources.

The 2024 HM&FMP Update establishes a series of specific mitigation strategies that were developed collaboratively with the intent to meet the identified mitigation goals. These strategies provide a basis for continued planning to develop specific action plans. These actions will be implemented over time and can provide a means to measure progress towards hazard reduction. The Plan also describes future update and maintenance procedures.

Participating Jurisdiction(s): Town of Coventry, Rhode Island
Year HM&FMP Completed: 2024

	Estimated Losses							
	# of CF^	$ of CF	# of People	# of Residences	$ of Residences**	Extent	Probability	CEMA Level of Concern
Severe Thunderstorm	99	$11,781,420,000	35,388	14,931	$6,979,092,813	Limited	Highly Likely	Low
Dam Failure	29	$128,150,000	2,230*	941	$439,845,043	Significant	Possible	High
Flooding	25	$12,000,000	5,131*	2,165	$1,011,970,795	Limited	Likely	Medium
Riverine Erosion	24	$11,500,000	0	0	$0	Limited	Possible	Medium
Tropical & Extratropical Storms	99	$11,781,420,000	35,388	14,931	$6,979,092,813	Limited	Possible	Medium
Severe Winter Weather	99	$11,781,420,000	35,388	14,931	$6,979,092,813	Limited	Highly Likely	Medium
Brushfire	99	$11,781,420,000	35,388	14,931	$6,979,092,813	Limited	Possible	Low
Drought	99	$11,781,420,000	35,388	14,931	$6,979,092,813	Limited	Likely	Low
Extreme Temperatures	99	$11,781,420,000	35,388	14,931	$6,979,092,813	Limited	Likely	Low
Tornadoes	99	$11,781,420,000	35,388	14,931	$6,979,092,813	Limited	Possible	Low
Earthquake	99	$11,781,420,000	35,388	14,931	$6,979,092,813	Negligible	Possible	Low

CF: Critical Facility

* number was determined by multiplying the number of affected residences by the average household size of 2.37.
** number was determined by multiplying the number of affected residences by the HUD replacement value of a 3 bedroom home in Narragansett, RI ($467,423).

FEMA APPROVAL LETTER

PLAN DISTRIBUTION LIST

The Town of Coventry's 2024 Hazard Mitigation and Floodplain Management Plan Update is distributed to:

- Town of Coventry
- Rhode Island Emergency Management Agency (RIEMA)
- Federal Emergency Management Agency (FEMA)

RECORD OF CHANGES

Hazard Mitigation Plans should be continually updated as circumstances change, new data becomes available, hazards are mitigated, etc. This Record of Changes Table is included to summarize and document changes to this document as they are made throughout time.

Change ID	Description of Changes	Date
01	Updated February 2018 Town of Coventry HMP Update to include a Floodplain Management Plan	XX

1. PLAN INTRODUCTION AND BACKGROUND

Hazard mitigation planning is required under the Disaster Mitigation Act of 2000 (DMA 2000) which identified the need for Tribal, Local, and State jurisdictions to coordinate mitigation planning and implement mitigation efforts. It also provided the legal basis for the Federal Emergency Management Agency's (FEMA) mitigation plan requirements for mitigation grant assistance.

1.1 Plan Purpose

Disasters may cause loss of life, damage buildings and infrastructure, and have devastating effects on a community's economic, social, and environmental well-being. The Town of Coventry intends to reduce or eliminate the long-term risk to life and property from hazards by implementing a Hazard Mitigation Plan. The Plan is intended to reduce community risk and promote long-term sustainability by:

- Protecting the public and preventing loss of life and injury.
- Reducing harm to existing and future community assets.
- Preventing damage to a community's cultural, economic, and environmental assets.
- Minimize downtime and speed up recovery following disasters.
- Reducing the costs of disaster response and recovery and the exposure of first responders to risk.
- Helping accomplish other community objectives, such as leveraging capital improvements, infrastructure protection, and economic resiliency.

1.2 Community Rating System (CRS) Program

The Community Rating System (CRS) is a voluntary incentive program that recognizes and encourages community floodplain management practices that exceed the minimum requirements of the National Flood Insurance Program (NFIP). Over 1,500 communities participate nationwide.

In CRS communities, flood insurance premium rates are discounted to reflect the reduced flood risk resulting from the community's efforts that address the three goals of the program:

1. Reduce and avoid flood damage to insurable property
2. Strengthen and support the insurance aspects of the National Flood Insurance Program
3. Foster comprehensive floodplain management

Through the development of this HM&FMP, the Town of Coventry intends to join CRS. By joining CRS, the Town hopes to encourage more residents to purchase flood insurance.

1.3 Hazard Mitigation & Floodplain Management Plan Layout Description

The Town of Coventry's 2024 HM&FMP Update consists of the following sections and appendices:

- **Section 1- Plan Introduction and Background**

  Defines what a HM&FMP is and its benefits. Provides Coventry's general history and background, including historical trends for population, the demographic and economic conditions that have shaped the area, as well as the government and leadership within the Town.

- **Section 2- Planning Process**

  Describes the planning process for the HM&FMP update, identifies the Planning Team members, lists the meetings held as part of the planning process, and lists the key stakeholders within the surrounding area. This section documents public outreach activities performed by the Town of

Coventry (supporting documents are in Appendix XX); including document reviews and relevant plans, reports, and other appropriate information and data utilized for this HM&FMP update.

- **Section 3- Risk Assessment**

  Describes the process through which the Planning Team identified, screened, and selected the hazards for profiling in this version of the HM&FMP Update. The hazard analysis includes the nature of the hazard, previous occurrences (history), location, extent, and impact of past events, and future event recurrence probability for each hazard. The influence of climate change is also discussed within each hazard profile.

  The Risk Assessment identifies the Town's potentially vulnerable assets—people, critical facilities, critical infrastructure, and residential and non-residential buildings. The resulting information identifies the full range of hazards that the Town could face and the potential damages, economic losses, and social impacts. Land use and development trends are also discussed.

- **Section 4- Programmatic Capabilities**

  This section lists the Town's policies, programs, available resources, and governmental authorities. State programs, National Flood Insurance Program (NFIP) participation activities, subdivision/land development, and zoning ordinances are discussed.

- **Section 5- Mitigation Strategy**

  Defines the Town of Coventry's mitigation strategy which provides a blueprint for reducing the potential losses identified in the vulnerability analysis.

  The Planning Team developed a list of specific mitigation goals and potential actions to address the risks in Coventry. Mitigation actions include structural projects, emergency services, natural resource protection strategies, property protection techniques, preventive initiatives, and public information and awareness activities. The status of mitigation actions identified in the 2018 HMP are provided.

- **Section 6- Plan Maintenance**

  Describes the formal Plan maintenance process to ensure that the HM&FMP remains an active and applicable document. This section includes an explanation of how the Planning Team intends to organize their efforts to ensure that updates and revisions to the HM&FMP occur in an efficient, well-managed, and coordinated manner.

- **Section 7- Plan Update**

  This section describes hazard events that have occurred and changes in development since 2018; changes in mitigation priorities; and describes how the mitigation plan was integrated into other planning mechanisms.

- **Section 8- Plan Adoption**

  Describes the Town of Coventry's adoption process of the HM&FMP Update. Supporting documentation can be found in Appendix XX.

- **Section 9- References**

  Lists reference materials and resources used to update this HM&FMP.

- **Section 10- Appendices**

Appendix XX: Delineates federal, state, and other potential mitigation funding sources. This section will aid the Town of Coventry with researching and applying for funds to implement their mitigation strategy.

Appendix XX: Provides the FEMA Local Mitigation Plan Review Tool, which documents compliance with FEMA guidelines.

Appendix XX: Provides the FEMA CRS Activity 510- Floodplain Management Planning Checklist, which documents compliance with FEMA guidelines for CRS credit.

Appendix XX: Provides the Town's adoption resolution.

Appendix XX: Provides the current FEMA FIRMs to depict flood hazard areas in Coventry.

Appendix XX: Provides public outreach information, including survey results.

Appendix XX: Provides the MRP Summary of Findings (May 2023) report.

Appendix XX: Provides maps of identified hazard areas and critical facilities.

1.4 Planning Area

1.4.1 Background

The Town of Coventry, in Kent County Rhode Island is located approximately 15 miles southwest from Providence, the State's Capital. It is bounded on the north partly by the Town of Scituate, partly by the Town of Foster, and partly by the City of Cranston; on the east by the Town of West Warwick; on the south partly by the Town of West Greenwich and partly by the Town of East Greenwich; and on the west by the State of Connecticut.

Coventry has a population of 35,688 (2020 Census). Its land area of 64.8 square miles is the largest in the state.

1.4.2 History

In 1643, Samuel Gorton and 11 other European colonists purchased lands within the boundaries of current day Coventry from the Shawomet people, members of the Narragansett Tribe. Coventry was also the home of Nathanael Greene, general in the continental army under George Washington during the American Revolution. His home stands to this day and serves as a local museum.

Originally part of Warwick, Coventry was incorporated in 1741 after an increase in population, settlement to the west, and geographic isolation from the town center. As growth continued and major thoroughfares were established, roadside business soon followed to serve travelers; local farmers operated taverns, grist mills, and sawmills.

With the Industrial Revolution, the railroad and newly constructed mills connected Coventry to a larger industry and economy. Several mills were constructed along the Pawtuxet River leading to the creation of a series of dams along the river. Tiogue Lake, the Flat River Reservoir and other mill ponds were created to power mills that required the steady employment of large numbers of people. Standardized housing and company-built stores and schools can still be seen in many of the village centers. These village centers, which sprung up around the mills, were concentrated in Eastern Coventry while Western Coventry remained largely rural.

After the decline of the textile industry in the late 1800s, there was a short-lived period of light manufacturing. While this kept some of the old mill buildings in operation, population growth began to stagnate. The completion of Route 3, Route 117, and Interstate 95 brought parts of Coventry within reasonable commuting distance to the Providence Metro area.

Although there is no centralized commercial area, development growth has occurred around the mill ponds and in the eastern part of town. As growth continues to this day, the distinct mill villages in Eastern Coventry have begun to coalesce into one developed area. However, Western Coventry retains its rural character.

1.4.3 Demographics

Coventry's population is concentrated in the east, around the old mills and village centers as well as more modern suburban developments, while Western Coventry remains largely rural and less densely populated.

Of the 35,688 people in Coventry 90.89% are white and 17.83% are aged 65 or older. The median income

is $94,800. In 2022, 7.8% of the population was below the poverty line (total family income is less than weighted thresholds measured by U.S. Census Bureau).

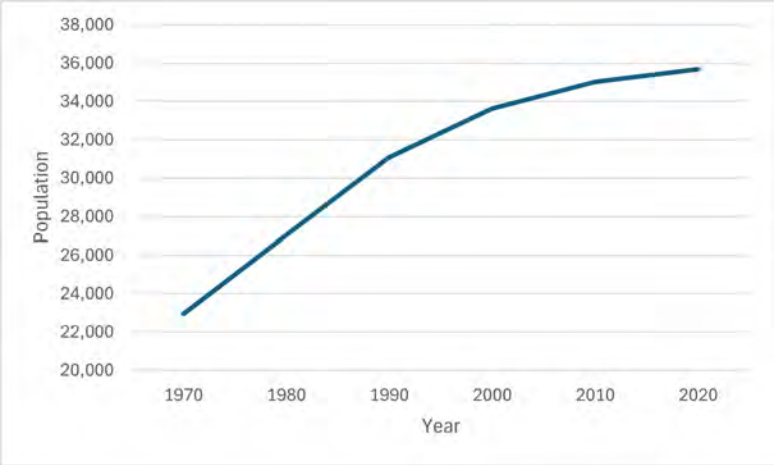


Figure 1- Town of Coventry Historical Population (1970-2020)

Table 1 provides demographic information based on the 2020 Decennial Census and the 2022 American Community Survey 5-year Estimates.

Table 1- Town of Coventry Demographics

Total Population (2020)	35,688
Median Age	44.2
Employment Rate	63.7%
Total Housing Units	14,931
Total Households	14,23
Average Family Size	2.44
Median Household Income	$94,800
Bachelor's Degree or Higher	31.3%
Has Healthcare Coverage	97.7%

Source: US Census 2024

1.4.4 Government

As stated above, Coventry incorporated in 1741 as population growth created greater independence from nearby Warwick. The Town of Coventry is governed by an elected Town Council with seven (7) members- five (5) members serve 2-year terms and two (2) members serve 4-year terms. Day to day operation of the town is delegated to an appointed Town Manager who reports to the Town Council.

1.4.5 Public Safety

Police

Law enforcement and protection of persons and property is provided by the Police Department's three divisions: patrol, detective, and administrative. The police force employs 57 sworn officers and 17 professional employees.

The patrol division, in addition to conducting a 24-hour patrol, includes school resource officers, dispatchers, domestic violence advocates, and crossing guards. Animal control, under the patrol division, operates daily from 9am-3pm.

The detective division handles major offenses and felony crimes as well as maintenance of the sex offender registry, background checks, and prosecution of police department cases.

The administration division is responsible for public records and record request management, training, recruitment and hiring, departmental IT, facility management, payroll, budget preparation and management, and grant management. The department operates a fleet of 61 patrol cars, 1 boat for water rescues, and a UTV for wooded operations (2024 Draft Comprehensive Plan). Officers are accredited and wear body worn cameras.

The 2024 Draft Comprehensive Plan states:

> "The Police Department call volume decreased to 19,000 calls in 2021 likely due to Covid-19, lower than the 28,000 calls received in 2017. Most calls received are related to general complaints, domestic issues, larcenies, opioids, and overdoses. According to the Police Chief, the number of opioid calls has been increasing and officers deploy Narcan when needed. Additionally, police have seen an uptick in cases involving Fentanyl, a synthetic and extremely strong opioid. Behavior associated with opioid use and abuse creates safety concerns for users, public safety officers, and members of the public."

Average response time to an emergency dispatched call is approximately four minutes throughout town. The Town's Emergency Operations Center (EOC) in the Town Hall Annex, 1675 Flat River Road serves as the center for preparation and response to a natural or human caused disaster. Through the use of grant funding, its computer and communication capabilities have been enhanced. The Police Chief currently serves as the Emergency Management Director, appointed by the Town Manager, and supported by the Deputy Emergency Management Director and Emergency Management Assistant.

Fire

The four (4) Coventry fire districts (Coventry/Anthony, Central Coventry, Hopkins Hill, and Western Coventry) provide first response to emergency incidents. Central Coventry and Western Coventry operate two fire stations each, while Hopkins Hill and Anthony operate one station per district.

Western Coventry and Anthony fire districts each have a fire chief, while Central Coventry and Hopkins Hill are overseen by one chief. Four full time fire department employees manage dispatch from within the police station. According to the 2024 Draft Comprehensive Plan, each district maintains the following staff:

- Central Coventry: 30 full-time firefighters
- Western Coventry: 2 full-time firefighters, 15-17 per diem firefighters
- Anthony: 10 full-time firefighters
- Hopkins Hill: 10 full-time firefighters

The 2024 Draft Comprehensive Plan states:

> "In 2021, the Fire Department responded to around 6,400 calls across all four districts. According to data from the Central Coventry Fire District, the largest fire district in Coventry, most calls are categorized as Rescue and Emergency Medical Service Incidents, including motor vehicle crashes and EMS calls. Fire calls accounted for around 3% of calls and hazardous conditions without a fire accounted for roughly 4% of calls."

Firefighters are trained in various matters which include search and rescue, EMT services, and firefighting. The Hopkins Hill Fire Department is equipped with a mobile mass chemical decontamination team. The 2018 Hazard Mitigation Plan identifies these businesses as potential sources of hazardous spills following disasters:

- Boston Scientific- medical (Industrial Drive)- radiation
- Suburban Propane (2030 Flat River Road)
- Rhodes Technologies- manufacture active ingredients
- Arkwright- located adjacent to the Pawtuxet River
- BioSci
- Pasteryak Asphalt at 75 Airport Road (no longer in service as of 2024)

The Hopkins Hill Fire Chief currently serves as the Deputy Emergency Management Director appointed by the Town Manager.

Coventry High School serves as the primary local emergency shelter. As of September 2017, a new sheltering plan is being drafted by the Emergency Management Assistant that will include Summit Station 2 at 1110 Victory Highway as an alternate shelter facility.

The Town's Community Emergency Response Team (CERT) volunteers are trained in disaster preparedness for hazards that may impact their area.

Communication

The Town of Coventry holds more than 12 FCC Radio Authorization licenses for use in Public Safety Communications. In addition, the Town has resources available in the Amateur Radio Community where individuals are licensed by the FCC to operate equipment at an amateur radio station to engage in two-way personal communications with other amateur operators on radio frequencies assigned to the amateur radio service.

The Coventry Police Department has the ability to operate on Public Safety bands- VHF/800MHz as well as Amateur Radio 2 meter. The Department has both mobile and hand-held radios in all the above bands to insure operability during all events. The Coventry EMA also has the ability to operate on Public Safety bands-VHF/UHF/800MHz. The Department has both mobile and hand held radios in all the above bands to insure operability during all events. The EMA sponsors an AMC (Amateur Radio Club) KC1CUE with about 20 members. They maintain amateur radios in the EOC with 2 mobile radio go-kits to work outside of the building if needed. The Coventry EMA is in the process of forming a relationship with Rhode Island ARES (Amateur Radio Emergency Service) whose mission is to develop and maintain an appropriately trained pool of Amateur radio operators who are available and qualified to provide situational awareness, auxiliary, public service, health and welfare and emergency communications support to any incident response agency requiring those services and to the people of Rhode Island in times of need.

Communication equipment is located throughout the Town.

- Communication Towers/Repeaters
  - 570 Read School House Rd. (Police and Fire)
  - 210 Piggy Ln. (Ri13844-a) (Police and EMA)
  - Waterman Hill Rd. (Police and Fire)
  - 1075 Main St.
  - 1111 Main Street (Fire)
  - 40 Reservoir Rd.
  - 1675 Flat River Road (Amat)
  - 60 Wood St.
- Police Department Receivers
  - 571 Washington St.
  - 40 Reservoir Rd.
  - 546 Main St.

- Cell Towers (privately owned)
    - 210 Piggy Ln. (Ri13844-a)
    - Provident Place (Ri13843-a)
    - 40 Reservoir Rd. (4pr0671c)
    - 12 La Casa Dr. (4pr0672b)
    - Arnold Rd. Exit off Rt. 95
    - 50 Wood St.

In an event of an emergency, Coventry officials issue alerts through CodeRED, a high-speed notification system. The CodeRED system allows messages to be quickly delivered to targeted areas or the entire Town. This system is used to notify subscribers of incoming severe weather events or other public safety issues.

1.4.6 Roads and Bridges

There are 259.26 miles of streets and highways in Coventry. Major arterial roads include Route 102, Route, Route 116, Route 117, Route 118, and Route 3 in the southeast sector of the Town which provides access to Interstate Route 95. In Coventry, about 60% of arterial and their associated collector roadways fall under state jurisdiction (2024 Draft Comprehensive Plan).

Another roadway of note is the Coventry Greenway and Trestle Trail bike path, part of the 19-mile Washington Secondary trail, itself part of the East Coast Greenway. The Washington Secondary Trail connects the communities of Coventry, West Warwick, and Cranston. In Coventry itself, the greenway connects residents to local businesses, neighborhoods, recreation sites, and public services such as the library (2024 Draft Comprehensive Plan).

According to the Rhode Island Department of Transportation (RIDOT) Bridge Condition Map, there are 18 bridges within the Town of Coventry, of which, 8 are in good condition, 4 are in fair condition, and 6 are in poor condition. The 6 in poor condition are Hill Street, Cahoone Road, Nicholas Road, Harris, Maple Valley Road, and Summit RR. Hill Street and Cahoone Road are closed to all traffic (RIDOT 2024).

1.4.7 Utilities

<u>Water Supply</u>

The Kent County Water Authority (KCWA) is the only public water supplier in Coventry, with 27,392 connections in 2022 across the towns of Coventry, North Kingstown, West Greenwich, West Warwick, Scituate, East Greenwich, Warwick, and Cranston. There are 8,483 active connections in Coventry's service area, which extends from the eastern border to Read Schoolhouse Rd. Estimates suggest that these connections serve 77% of the local population. The remaining population relies upon private or community wells (2024 Draft Comprehensive Plan).

There are two (2) wellhead protection areas identified by the Rhode Island Department of Environmental Management (RIDEM) for public water supply in the town. These are designated as the Spring Lake Wellhead protection area and the Mishnock Well Field protection area. These areas have been recognized as critical resource areas. The identification of potential sources of groundwater contamination due to commercial or industrial uses is a component of hazard mitigation. In Coventry, potential sources of contamination include hazardous materials stored improperly, and sediment and oil/petrochemicals in road runoff.

About 10% of the water supplied by the KCWA comes from the Mishnock Wellfield within Coventry, capable of producing 2.4 million gallons per day. This water is treated locally at the Mishnock Wellfield

Treatment Facility (2024 Draft Comprehensive Plan).

The 2018 Hazard Mitigation Plan identifies point driven wells at Johnson's Pond, private wells in Western Coventry, and agricultural water sources as vulnerable to drought and critical for not only drinking water but also fire suppression throughout the community.

Wastewater

As of May 2016, 97% of the residents in Coventry rely on onsite wastewater treatment systems (OWTS). Flood events and resulting saturation of soils have caused the failure of many septic systems & cesspools. Failures of these systems result in contamination of groundwater; exposure of dug/shallow or overburden wells to contamination; lack of bath/shower water; and a need for potable water sources.

The remaining 3% of the population use the West Warwik Regional Wastewater Treatment Facility. Service is very limited, serving only customers along Route 117, Route 3, Hopkins Hill Rd, Route 33, New London Turnpike, and portions of the Center of New England. The Woodland Manor, Sandy Bottom Road, and Flat River Road pump stations service 611 sewer customers in Coventry. The proposed construction of a new pump station at Briar Point will service the already constructed but inactive sewer line on Arnold Rd. The West Warwick Wastewater Treatment Facility treats all the raw sewerage from Coventry. Coventry owns 25% of the 10.5 million gallons per day capacity of the facility but has historically utilized 18-20% of the leased capacity. The community has prioritized increased utilization of the sewer service to protect water and environmental quality as well as to attract further development (2024 Draft Comprehensive Plan).

Stormwater Management

Coventry's Department of Public Works manages and maintains the community's stormwater system, encompassing 2,517 catch basins, 11 structural Best Management Practices (BMP's), and 14 outfalls (2024 Draft Comprehensive Plan).

The 2024 Draft Comprehensive Plan states that there are several intersections that experience flash flooding in rain events, including:

- State-owned:
  - Washington St. at Laurel Ave.
  - Main St. at Trestle Bridge
  - Flat River Road at House 1668
  - Knotty Oak Road (Route 116)
  - Tiogue Ave. between Hopkins Hill Rd and Jefferson Dr.
- Town-owned:
  - Johnson's Blvd at West Lake Dr.
  - LaForge Dr at Gervais St.
  - Maple Valley Rd.
  - Industrial Dr.
  - Taft St., Greene St., and The Pembroke Neighborhood (neighborhoods surrounding the Nathanael Greene Homestead)

The 2018 HMP also lists the following areas as lacking adequate drainage, leading to flooding and hazardous driving conditions:

- Laurel Ave. at Washington
- Bridge trestle at Main St. (Between Route 116/Knotty Oak Rd. and Route 33/Sandy Bottom Road)
- Knotty Oak

- Maple Valley
- Industrial Drive
- Tiogue Ave. between Hopkins Hill Rd. and Jefferson Drive.

Solid Waste Management

Coventry's Department of Public Works (DPW) manages solid waste management for the community, including curb-side trash, recycling, bulk item, and yard waste pick up. DPW operates a waste transfer station at 1668 Flat River Road and reported 24.8% recycling and 33.8% diversion rates in 2021. These fall below the respective 35% and 50% Rhode Island State goals.

Trash and recycling pickups occur weekly, conducted by a staff of 12 and a full time recycling coordinator as well as a foreman. DPW also operates diversion programs, including composting workshops, a bike bank, and a furniture bank.

Electricity

Rhode Island Energy provides all the natural gas and most of the electrical needs in Coventry. In the early 2010's Coventry developed its first wind turbine, renewable energy projects. There are currently 10 turbines located in Coventry, each capable of producing 1.5 megawatts of electricity. These turbines are all privately owned: 3 by the Narragansett Bay Commission, 3 by the Town of Warwick, and 4 by Rhode Island Energy. The Town of Coventry identifies 3 scales of solar power generators: major (40,000 sq. ft. and greater), medium (1,751-39,999 sq. ft.), and minor (1,750 sq. ft. or less). The Town of Coventry has installed minor, roof-mounted solar installations on the Hopkins Hill Fire District and the Town Hall Annex building. There are currently two major, ground-mounted solar installations at Lewis Farm Road and Flat River Road, as well as a 5-megawatt site at the former Arnold Road Landfill, a designated superfund site (currently being constructed as of August 2024). The town has also engaged in energy efficiency projects such as transitioning streetlights to LED bulbs and energy audits of school and municipal buildings (2024 Draft Comprehensive Plan).

1.4.8 Forest and Open Space

Coventry's forests represent 67% of the land cover across the community and 7.2% of forested land within the state. There are 26,597 forested areas in Coventry; deciduous (>80% hardwood), mixed, and softwood forests represent 11,741 acres, 9,908 acres, and 4,948 acres respectively (RIGIS, 2020). Of this forested area, 18,192 acres (46% of Coventry's land area) are unfragmented tracts greater than or equal to 250 acres; 31% (5,589 acres) of this unfragmented forest is conserved by local or state agencies (2024 Draft Comprehensive Plan). Most of the forested land and open space is located in Central and Western Coventry. State holdings and Audubon Society holdings in these areas present an opportunity for conservation and open space preservation.

The residents of Coventry continue to reaffirm the importance of conserved open space for recreation, community and individual health, and to maintain the charm and character of the town itself. The Coventry Land Trust is the local authority on open space conservation, tasked with identification, prioritization, and decision making on valuable parcels for conservation. There are three common pathways for protecting open space within Coventry: publicly owned open space, non-profit owned open space, and privately owned open space. Publicly owned open space properties are owned by the Town, DEM, the Coventry Land Trust, or the Kent County Water Authority and consist of 5,045 acres. Non-profit-owned properties are owned by The Pawtuxet River Authority and Watershed Council (PRAWC), the Audubon Society of Rhode Island, and The Nature Conservancy and consist of 1495.5 acres. Privately-owned properties are generally owned by local developers with a conservation easement held by the Town of Coventry; these areas consist of 1,280.8 acres. These easements usually come from Residential

Cluster Developments which allow developers to build with less restrictive codes in exchange for reserving 40% of the total land area for open space. This 40% is in addition to land required for stormwater management, and a maximum 50% of this reserved land area can be land unsuitable for development (2024 Draft Comprehensive Plan).

Coventry's Parks and Recreation Department operates over 35 local parks, sports fields, and other recreational resources throughout the town. The 2018 Hazard Mitigation Plan identifies these open spaces as potential Wildfire risks, especially from lightning ignited fires.

1.4.9 Water Resources

The Town of Coventry is traversed by rivers, brooks, and streams, covering a total of 1,850 acres. These waters provide essential habitat, support recreation, and recharge the groundwater used to supply the community. The many bodies of water in and about Coventry are an integral part of the character of the community. Coventry is made up of 4 distinct watersheds:

- Pawtuxet River Watershed (66% of the community) in Eastern Coventry
- Quinebaug River Watershed (32.5% of the community) in Western Coventry
- Wood-Pawcatuck Rivers Watershed (1.4% of the community) in Southwest Coventry
- Hunt River Watershed (0.1% of the community) in Southeast Coventry

(2024 Draft Comprehensive Plan)

Water bodies of significance include:

- 8.5 miles of the South Branch of the Pawtuxet River.
- Flat River Reservoir sub-watershed: Flat River Reservoir, also known as Johnson's Pond, Quidnick Reservoir and Stump Pond, among other small reservoirs and tributary streams
- Tiogue Lake
- Big River
- Mishnock-Big River Groundwater Reservoir and recharge area: identified for potential supply of future and existing water supply systems with large quantities of groundwater.

Recent studies have also identified forever chemicals in water supplies in Coventry associated with per- and polyfluoroalkyl substances (PFAs). Unfortunately, many of Coventry's surface waters have been impacted by pollution and over-development, leading to restrictions on swimming and fishing recreation. These restrictions are due to pollutants which include mercury, enterococcus bacteria, lead, zooplankton, and non-native invasive aquatic plants. Impacted waterways include but are not limited to:

Table 2- Impaired Waterbodies in Coventry

Waterbody	Contaminant	Recreation Restriction
Flat River Reservoir (Johnson's Pond)	Mercury, Non-native invasive aquatic species	Fish consumption not supported, fish and wildlife habitat impaired
Stump Pond	Non-native invasive aquatic species	
Quidnick Reservoir	Mercury	Fish consumption not supported
Mishnock River**	Enterococcus	Recreation not supported
Pawtuxet River South Branch**	Lead	Fish and wildlife habitat impaired
Tributary #3 of Pawtuxet River South Branch (.62 mi)	Lead, enterococcus	Fish and wildlife habitat impaired, recreation not supported

Waterbody	Contaminant	Recreation Restriction
Pawtuxet River North Branch (.5 mi from Gainer Memorial Dam to Arkwright Bridge)	Lead, mercury	Fish and wildlife habitat impaired, fish consumption not supported
Carbuncle Pond (38.9 acres)	Non-native invasive aquatic plants, mercury	Fish and wildlife habitat impaired, fish consumption not supported
Tiogue Lake	Non-native invasive aquatic plants/fish/shellfish/zooplankton, bacteria	Fish and wildlife habitat impaired, recreation not supported (during major bacterial events)
Tributaries to Tiogue Lake*	Enterococcus	Recreation not supported
Upper Dam Pond*	Total Phosphorous (TMDL), non-native invasive aquatic plants	
Moosup River**	Enterococcus	
Anthony Brook**	Enterococcus, non-native invasive aquatic plants	
Hawkinson Brook*	Enterococcus	

*Stormwater impaired waterbodies **Potentially stormwater impaired waterbodies

Source: 2024 Draft Comprehensive Plan

In addition to the rivers, lakes, and ponds in Coventry, wetlands make up about 15% of the community. Wetlands perform several important ecosystem services including stormwater management, nutrient retention, groundwater recharge, and wildlife habitat. While an incredibly productive ecosystem, wetlands are particularly sensitive to nearby development, fragmentation and parcelization, and any disruption to the natural water cycle.

Major wetlands in Coventry include: Mishnock Swamp, Great Grass Pond, and Whitford Pond near the town's southern border.

The health of these waterbodies and wetlands is paramount as much of Coventry relies on aquifers to supply private and community wells. Aquifers rely on precipitation within the watershed to recharge their reservoirs, which poses potential problems as climate change increases weather extremes. Extended droughts can deplete reservoirs while intensifying rain and flooding can contaminate reservoirs with pollutants in the flood waters. The Mishnock Groundwater Reservoir, its recharge tributaries, and the aquifer tributary to the Spring Lake Wellhead has been identified as extremely vulnerable to contamination (2024 Draft Comprehensive Plan).

1.4.10 Historic and Cultural Resources

The Town of Coventry has evidence of human habitation going back 6,000 years. Many local landmarks bear Native American names, and there are still sites sacred to the Mashapaug Narragansett Indigenous community. This long history has led to the inclusion of 20 sites within Coventry on the National Register of Historic Places (Draft 2024 Comprehensive Plan). However, many historic resources in Coventry are threatened by insufficient identification, protection, documentation, and education of the public about proper preservation measures. In 1971, the Coventry Historic Society formed to protect the Read Schoolhouse from demolition and have focused on historic preservation advocacy as well as offering historic education programming. In addition to the Coventry Historic Society, the Coventry Historic Preservation Commission focused on identifying artifacts and obtaining maintenance funding (2024 Draft Comprehensive Plan).

There are over 200 historic cemeteries within Coventry, 41 of which are maintained by the town. The Town also hosts about 15 Christian denomination churches (2024 Draft Comprehensive Plan).

The National Park Service has designated Coventry as a Certified Local Government (CLG). The CLG program, administered by The Rhode Island Historic Preservation and Heritage Commission (RIHPHC), awards planning grants for local historic districts. Locally, only the Paine House Historic District is currently eligible for grants, though other districts may be created by the town council. The Paine House is also one of two local museums, alongside the Nathanael Greene Homestead Museum (2024 Draft Comprehensive Plan).

The South Main Street Historic District (residential) and the Rice City National Register Historic District (rural) include:

- 11 mid-nineteenth century houses
- 9 late 1700s/early 1800s houses
- 27 architecturally historically important buildings
- 2 archeological sites
- 14 family cemeteries
- 1 state management park area (Nicholas Farm Management Area)
- 1 abandoned and overgrown 18th century dirt road

Other structures of historic significance include the Nathanael Greene Homestead, Waterman Tavern, and the Paine House.

2. PLANNING PROCESS

This section provides an overview of the planning process; identifies the key stakeholders and Planning Team members, documents public outreach efforts, and summarizes the review and incorporation of existing plans, studies, and reports used to update this HM&FMP. Meeting information regarding the Planning Team and public outreach efforts are included below, and outreach support documents are provided in Appendix XX.

This section addresses Element A of the Local Mitigation Plan regulation checklist.

Regulation Checklist- 44 Code of Federal Regulations (CFR) § 201.6 Local Mitigation Plans
ELEMENT A. Planning Process
A1. Does the plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction? (Requirement 44 CFR § 201.6(c)(1)) A1-a. Does the plan document how the plan was prepared, including the schedule or time frame and activities that made up the plan's development, as well as who was involved? A1-b. Does the plan list the jurisdiction(s) participating in the plan that seek approval, and describe how they participated in the planning process? A2. Does the plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development as well as businesses, academia, and other private and non-profit interests to be involved in the planning process? (Requirement 44 CFR § 201.6(b)(2)) A2-a. Does the plan identify all stakeholders involved or given an opportunity to be involved in the planning process, and how each stakeholder was presented with this opportunity? A3. Does the plan document how the public was involved in the planning process during the drafting stage and prior to plan approval? (Requirement 44 CFR § 201.6(b)(1)) A3-a. Does the plan document how the public was given the opportunity to be involved in the planning process and how their feedback was included in the plan? A4. Does the plan describe the review and incorporation of existing plans, studies, reports, and technical information? (Requirement 44 CFR § 201.6(b)(3)) A4-a. Does the plan document what existing plans, studies, reports, and technical information were reviewed for the development of the plan, as well as how they were incorporated into the document?
Source: FEMA 2022 (Local)

CRS Activity 510 Planning Process- Credit Checklist
Step 1. Organize and Prepare the Plan (Max 15 credits)
1a. Involve your community's land use and comprehensive planning office (4 credits) 1b. Include your community departments that implement the activities listed in Step 7 in the planning committee, such as building department, code enforcement, engineering, land use planning, zoning, public works, emergency management, public safety, public information, environmental protection, public health, parks and recreation, housing and community development, and council members (9 credits) 1c. Formally recognize the planning process and/or committee through the governing body (2 credits)
Step 2. Involve the Public (Max 120 credits)
2a. Planning process conducted through a planning committee (60 credits) 2b. Public meetings held at the beginning of the planning process (15 credits) 2c. Public meeting held on draft plan (15 credits) 2d . Other public information activities to encourage input (Up to 30 credits)

CRS Activity 510 Planning Process- Credit Checklist
Step 3. Coordinate with Other Agencies
3a. Review of existing studies and plans (required) (5) 3b. Coordinate with communities and other agencies (Up to 30)
Source: FEMA NFIP CRS Coordinator's Manual (2017), 2021 Addendum

2.1 Overview of the Planning Process

This HM&FMP Update follows the following FEMA Guidance for Planning:

- FEMA 2022/2023 Local Mitigation Planning Policy Guide
- FEMA 2021 Addendum to the 2017 CRS Coordinator's Manual

The Town's first HMP was completed in 2005, 2010, and 2018.

The Town of Coventry initiated this hazard mitigation update planning effort on July 11, 2024. This Hazard Mitigation and Floodplain Management Plan Update is the result of a dedicated group of individuals working on an expedited timeline (~6 months) to identify natural hazards and proposing ways to improve Coventry's resiliency to these events.

The Town hired a consultant, Fairweather Science, LLC, to assist with this planning effort. The Resolution Collaborative, LLC joined the team to assist with public engagement and local meeting facilitation. All meetings with the Planning Team and the consultants were held virtually, with the exception of the in-person risk assessment workshop, and complied with Rhode Island's Open Meetings policies. The public was notified of all meetings at least 48 hours in advance of the meeting and were invited to participate virtually or in-person at the Coventry Town Hall Annex Police Training Room.

The planning process began on July 18, 2024 with a kickoff meeting between the Planning Team, Fairweather Science, The Resolution Collaborative, and Rhode Island Emergency Management Agency (RIEMA). The focus of this meeting was to discuss the plan update process, project schedule, and items to be discussed at the risk assessment workshop the following week.

During the July 25 public risk assessment workshop the Planning Team discussed any events/disasters that occurred in the last 5 years and reviewed the hazards identified in the 2018 HMP. Any revisions to the previously identified hazards were discussed and it was decided to include riverine erosion as a new hazard in this plan update. The Planning Team then gave initial suggestions for mitigation projects, and reviewed the existing list of critical facilities. The Planning Team then discussed community lifelines and vulnerable and underserved populations and ways to engage them during the planning process. Lastly, the Planning Team reviewed a draft public survey to engage the public. The purpose of the survey was to capture the local residents' perception of natural hazards and obtain suggestions for mitigation projects. Copies of the survey were distributed at the Senior Center and the Housing Authority to be shared with the elderly population that may not have access to the electronic survey.

Table 3 provides a summary of the Planning Team's meeting dates and the activities that were conducted to update this HM&FMP. All meetings were open to the public per the Rhode Island Open Meetings Act, unless otherwise stated.

Table 3- Overview of Project Meetings and Other Important Dates

Date	Agenda	Attendees	
07/11/2024	**Internal Project Meeting** Team introductions; project overview and expedited schedule; discuss Planning Team members/players; set date for formal kickoff meeting with Planning Team. This internal project meeting was not advertised nor open to the public.	Town of Coventry	• Chief Fredrick Heise • Major Dennis Skorski • Captain Benjamin Witt • Therese Stafford • Maria Broadbent
		Fairweather Science	• Laura Young • Olivia Kavanaugh • Mason Page
07/18/2024	**Project Kickoff Meeting** No material information was discussed, but Fairweather Science presented a presentation on the following topics that would be discussed in detail at the risk assessment workshop on July 25, 2024. Copies of the presentation were sent to each attending Planning Team member to review prior to the meeting on July 25, 2024. Project overview; project goals review and update; hazard screening; RI disaster declarations since 2018 and impacts to the Town of Coventry; High Hazard Potential Dams; status of mitigation projects from 2018 HMP; new projects; critical facilities; community lifelines, underserved/vulnerable populations, neighboring communities, project stakeholders; methods of engaging the public (Town website, State website, social media, email lists), public survey; project schedule.	Town of Coventry CEMA Planning Team	• Chief Frederick Heise • Daniel Parrillo • Chief Frank Brown • Major Dennis Skorski • Captain Benjamin Witt • Therese Stafford • Joseph Levesque • Chuck Phelps • Pamela Leary • Kevin McGee • Doug McLean
		RIEMA	• Rae-Anne Culp
		Members of the public/stakeholders/ other Town representatives	• Cody Haughton • Mike Broggi • Catherine Pendola • Lauren Walker • Jessica Carsten • Carolyn Lacombe • Raena Blumenthal
		Fairweather Science	• Laura Young • Olivia Kavanaugh • Mason Page
		The Resolution Collaborative	• Loraine Della Porta
07/24/2024	Copies of printed surveys were hand delivered to the Coventry Resource and Senior Center (50 Wood St.) and the Coventry Housing Authority (14 Manchester Cir.) to engage the vulnerable/underserved populations in the community in the planning process.		
07/25/2024	**Risk Assessment Workshop** The following topics were discussed in detail at the in-person Risk Assessment Workshop held at the Town of Coventry	Town of Coventry CEMA Planning Team	• Chief Frederick Heise • Daniel Parrillo • Major Dennis Skorski • Captain Benjamin Witt • Therese Stafford • Joseph Levesque

Date	Agenda	Attendees	
	Town Hall Annex Police Training Room. Project overview and team introductions; review and update project goals from the 2018 HMP; hazard screening; review RI Disaster Declarations since 2018 and discuss any impacts to the Town of Coventry; discuss High Hazard Potential Dams and ownership; discuss status of mitigation projects from 2018 HMP; discuss ideas for new mitigation projects; review the list of critical facilities identified in the 2018 HMP and identify any new critical facilities to be added; community lifelines, underserved/vulnerable populations and how to engage them in the planning process; review a list of neighboring communities and project stakeholders; discuss methods of engaging the public in the planning process (Town website, State website, social media, email lists/blasts), public survey; discuss project schedule (expedited timeframe).		• Chuck Phelps • Pamela Leary • Kevin McGee • Doug McLean • Maria Broadbent • Robert Robillard
		Members of the public/stakeholders/ other Town representatives	• Mike Broggi • Lauren Walker • Raena Blumenthal • Joseph Donohoe (DOT) • Christos Xenophonotos (DOT) • Bob Brennan
		Fairweather Science	• Laura Young • Olivia Kavanaugh
		The Resolution Collaborative	• Loraine Della Porta
07/31/2024	Informational flyer and public survey were shared on the Town of Coventry's Facebook page requesting public input on natural hazards, mitigation project ideas, and overall pre-disaster preparedness.		

2.2 Coventry Hazard Mitigation Planning Team

This Hazard Mitigation and Floodplain Management Plan Update is a product of the Coventry CEMA Planning Team, which was formally created by the Town of Coventry. The Planning Team was led by the Town Police Chief, Frederick (Rick) Heise. Planning Team members included:

Table 4- Town of Coventry Hazard Mitigation Planning Team

Name	Role/Position	Organization
Fredrick (Rick) Heise	Planning Team Lead, EMA Director, Chief of Police	Town of Coventry
Daniel Parrillo	Town Manager	Town of Coventry
Maria Broadbent	Assistant Town Manager	Town of Coventry
Kevin McGee	Director of Public Works	Town of Coventry
Doug McLean	Planning Director	Town of Coventry
Robert Robillard	Human Services Director	Town of Coventry
Joe Levesque	Town Engineer	Town of Coventry

Name	Role/Position	Organization
Chuck Phelps	Building Inspector	Town of Coventry
Frank Brown	Deputy EMA Director, Fire Chief	Hopkins Hill Fire District
Dennis Skorski	Major, Police Department	Town of Coventry
Ben Witt	Captain, Police Department	Town of Coventry
Pam Leary	EMA Assistant	Town of Coventry
Julie Leddy	Executive Director	Coventry Housing
Therese Stafford	Business Manager, Police Department	Town of Coventry
Laura Young	Fairweather Science, LLC	HMP Consultant- Project Manager
Olivia Kavanaugh	Fairweather Science, LLC	HMP Consultant- Staff Scientist/ Mitigation Planner
Mason Page	Fairweather Science, LLC	HMP Consultant- Emergency Management Planner
Loraine Della Porta	The Resolution Collaborative, LLC	HMP Consultant- Public Engagement

2.3 Opportunities for Collaborators and Other Interested Parties to Participate

The Planning Team extended an invitation to all individuals and entities identified on the project mailing list in which they described the planning process and announced the upcoming planning activities. The announcement was emailed to relevant academia, nonprofits, and local, state, and federal agencies on July 17, 2024 and July 24, 2024.

The following agencies, neighboring communities, and community collaborators were invited to participate in and review the HM&FMP Update:

- American Red Cross, RI Region
- BLM- Northeastern States
- Central Coventry Fire District
- Coventry Fire District
- Coventry Land Trust
- Coventry Library
- Coventry Parks and Recreation
- Coventry Pines Golf Course
- Coventry School District
- Division of Statewide Planning
- EPA- Rhode Island
- FEMA Region 1
- Hopkins Hill Fire District
- HUD- Rhode Island
- Northern RI Chamber of Commerce
- NWS Boston Office
- Pawtuxet River Authority and Watershed Council
- Providence Water Supply Board
- Rhode Island National Guard
- RI Coastal Resources Management Council
- RI Department of Commerce
- RI Department of Education
- RI Department of Environmental Management
- RI Department of Health
- RI Department of Human Services
- RI Department of Public Safety
- RI Department of Public Utilities
- RI Department of Transportation

(RIDOT)
- RI Housing
- RI Rehabilitation Code Board
- RI Water Resources Board
- RIDEM- Department of Parks and Recreation
- State Fire Marshal's Office
- State Floodplain Coordinator
- State Mitigation Planning Supervisor
- State Planning Branch Chief
- State Representative- George Nardone
- State Representative- Michael Chippendale
- State Representative- Patricia Morgan
- State Representative- Sherry Roberts
- State Representative- Thomas Noret
- University of Rhode Island
- USACE- New England District
- USDA- Natural Resource Conservation Service
- USGS- Rhode Island
- Western Coventry Fire District

Neighboring Communities

The Town of Coventry heavily relies on neighboring communities during hazard events or disasters. Coventry Fire Department, Police, and EMS all have mutual agreements with the surrounding communities, including those across the Connecticut State Line, to aid one another as necessary.

The following neighboring communities were invited to participate in the planning process as collaborators:

- Scituate, RI
- Foster, RI
- Cranston, RI
- West Warwick, RI
- West Greenwich, RI
- East Greenwich, RI
- Sterling, CT

2.4 Public Input

This HM&FMP benefits from various distinct types of public input strategies that were utilized by the Planning Team during the drafting process and prior to its adoption by the Town Council. Public input for the 2024 HM&FMP was collected primarily through a public survey, public meetings, and an invitation to comment on the draft risk assessment and draft HM&FMP.

Survey

The online public survey was first shared on the Town of Coventry's official Facebook page on July 23, 2024 with a dedicated survey flyer and post shared on July 31, 2024. The survey link was attached to each public meeting notification and invitation. Residents also shared the survey in various private Facebook groups.

The survey was active from July 17, 2024 to XX, 2024. A total of XX survey responses were received.

Public Meetings

In compliance with Rhode Island's Open Meetings Act, all Planning Team meetings were open to the public. Most meetings had the option of in-person participation at the Coventry Town Hall Annex Police Training Room as well as a Microsoft Teams link to join the meeting virtually. The HMP contractor, Fairweather Science, facilitated all meetings remotely, besides the Risk Assessment Workshop which was facilitated in-person.

Public Review Periods

The public was provided two (2) opportunities to comment on the draft plan before it was submitted to RIEMA and FEMA for review. The first public review period was of the Draft Risk Assessment, which lasted from XX to XX, 2024.

Underserved Populations

Underserved populations (the elderly, low income) were engaged in the planning process by being provided paper copies of the survey to provide input. Printed surveys were hand delivered to the Coventry Resource and Senior Center (50 Wood St.) and the Coventry Housing Authority (14 Manchester Cir.) on July 24, 2024.

Feedback received from the public was used in confirming natural hazards that impact the Town, level of concern of each hazard, and critical facilities that the public relies on. Additionally, the Planning Team reviewed the list of mitigation projects that the public suggested.

Outreach support documents and survey results are provided in Appendix XX.

2.5 Review and Incorporation of Existing Plans, Studies, and Reports

During this HM&FMP update, the Planning Team reviewed and incorporated pertinent information from available resources since the 2018 HMP was completed. Newly collected data included available plans, studies, reports, and technical research listed in Table 5. The new data was reviewed and referenced throughout the document.

Table 5- Documents Reviewed

Plans, studies, reports, ordinances, etc.	Contents Summary (How will this information improve mitigation planning?)	Data Used (How was this information incorporated into this HM&FMP?)
2010 and 2018 Town of Coventry Hazard Mitigation Plans	Review past hazard events, mitigation activities, and planning processes.	Compared hazard profiles, history, and impacts of events for the hazard profiles.
2024 State of Rhode Island Hazard Mitigation Plan (SHMP)	Defines statewide hazards and their potential impacts.	Compared hazard profiles, history, and impacts of events for hazard profiles. Source of most current statewide hazard information.
Rhode Island 2022 Climate Update Report	Provides current climate change trends in Rhode Island.	Used information in hazard profiles to discuss the influence of climate change on the hazard.
2018 Resilient Rhody- An Actionable Vision for Addressing the Impacts of Climate Change in Rhode Island	A comprehensive report outlining the State's climate resilience action strategy.	Used information in hazard profiles to discuss the influence of climate change on the hazard.
2016 EC4 STAB Current State of Climate Science in Rhode Island report	Provides an overview of statewide climate change impacts.	Used information in hazard profiles to discuss the influence of climate change on the hazard.
2000 Coventry Comprehensive Plan, 2024 Draft Coventry Comprehensive Plan	Sets forth a vision and goals for the Town's future and provides the overall foundation for all land use regulation in Coventry.	Cited information from the Plan throughout the HM&FMP such as community background information, land use information, future goals of the Town, and various figures and maps.

Plans, studies, reports, ordinances, etc.	Contents Summary (How will this information improve mitigation planning?)	Data Used (How was this information incorporated into this HM&FMP?)
USACE National Inventory of Dams Database	Database that provides information on all dams in the United States	Database references during drafting of HM&FMP to document current dam information.
RIDEM 2019-2023 Annual Reports to the Governor on the Activities of the Dam Safety Program (RIDEM 2020b, 2021a, 2022, 2023 2024)	Provides an overview of dams in Rhode Island, activities performed since 2018, details on unsafe dam conditions, limitations of the State Dam Safety program.	Information on dams in Coventry cited in the Dam Failure section.
152 Mill Pond Dam Engineering Assessment (RIDEM 2002d), 2022 Visual Inspection/Evaluation Report (RIDEM 2022b)	Summarizes downstream impact area, downstream description, hazard potential assessment, and inundation mapping.	Used information on potential downstream impacts due to a dam failure, Inundation mapping used as basis of dam failure loss estimation.
167 Flat River Reservoir Dam Biennial Inspection/Evaluation Report (RIDEM 2020a)		
175 Quidnick Reservoir Dam Engineering Assessment (RIDEM 2002e), 2021 Visual Inspection/ Evaluation Report (RIDEM 2021b)		
176 Coventry Reservoir Dam Engineering Assessment (RIDEM 2002a), 2017 Visual Inspection/ Evaluation Report (RIDEM 2017)		
177 Tiogue Lake Dam Engineering Assessment (RIDEM 2002b), 2019 Visual Inspection/Evaluation Report (RIDEM 2019a)		
185 Black Rock Reservoir Dam Engineering Assessment (RIDEM 2006a), 2019 Visual Inspection/ Evaluation Report (RIDEM 2019b)		
186 Upper Pond Dam Engineering Assessment (RIDEM 2002b), 2011 Visual Inspection/Evaluation Report (RIDEM 2011)		
187 Middle Pond Dam Engineering Assessment (RIDEM 2006c)		
371 Pearce Pond Dam Engineering Assessment (RIDEM 2004), 2016 Visual Inspection/Evaluation Report (RIDEM 2016)		
498 Hopkins Farm Pond Dam Engineering Assessment (RIDEM 2006d), 2012 Visual Inspection/ Evaluation Report (RIDEM 2012a)		
561 Arnold Pond Dam Engineering Assessment (RIDEM 2002c), 2022		

Plans, studies, reports, ordinances, etc.	Contents Summary (How will this information improve mitigation planning?)	Data Used (How was this information incorporated into this HM&FMP?)
Visual Inspection/Evaluation Report (RIDEM 2022a)		
645 Center of New England #1 Dam Engineering Assessment (RIDEM 2007), 2012 Visual Inspection/ Evaluation Report (RIDEM 2012b)		

A complete list of references used to update this HM&FMP is provided in Section XX.

3. RISK ASSESSMENT

This section identifies and profiles the hazards that could affect the Town of Coventry.

This section addresses a portion of Element B of the Local Mitigation Plans regulation checklist.

Regulation Checklist- 44 CFR § 201.6 Local Mitigation Plans
ELEMENT B. Risk Assessment
B1. Does the plan include a description of the type, location, and extent of all natural hazards that can affect the jurisdiction? Does the plan also include information on previous occurrences of hazard events and on the probability of future hazard events? (Requirement 44 CFR § 201.6(c)(2)(i))
B1-a. Does the plan describe all natural hazards that can affect the jurisdiction(s) in the planning area, and does it provide the rationale if omitting any natural hazards that are commonly recognized to affect the jurisdiction(s) in the planning area?
B1-b. Does the plan include information on the location of each identified hazard?
B1-c. Does the plan describe the extent for each identified hazard?
B1-d. Does the plan include the history of previous hazard events for each identified hazard?
B1-e. Does the plan include the probability of future events for each identified hazard? Does the plan describe the effects of future conditions, including climate change (e.g., long-term weather patterns, average temperature, and sea levels), on the type, location, and range of anticipated intensities of identified hazards?
B1-f. For participating jurisdictions in a multi-jurisdictional plan, does the plan describe any hazards that are unique to and/or vary from those affecting the overall planning area?
B2. Does the plan include a summary of the jurisdiction's vulnerability and the impacts on the community from the identified hazards? (Requirement 44 CFR § 201.6(c)(2)(ii))
B2-b. For each participating jurisdiction, does the plan describe the potential impacts of each of the identified hazards on each participating jurisdiction?
Source: FEMA 2022 (Local)

CRS Activity 510 Planning Process- Credit Checklist
Step 4. Assess the Hazard (Max 35 credits)
4a. Plan includes an assessment of the flood hazard (REQUIRED) with: (1) A map of known flood hazards (5 credits) (2) A description of known flood hazard (5 credits) (3) A discussion of past floods (5 credits)
4b. Plan includes assessment of less frequent floods (10 credits)
4c. Plan includes assessment of areas likely to flood (5 credits)
4d. The plan describes other natural hazards (REQUIRED FOR DMA) (5 credits)
Step 5. Assess the Problem (Max 52 credits)
5a. Summary of each hazard identified in the hazard assessment and their community impact (REQUIRED) (2 credits)
5b. Description of the impact of the hazards on: (Max 25 credits)
(1) Life, safety, health, procedures for warning and evacuation (5 credits)
(2) Public health including health hazards to floodwaters/mold (5 credits)
(3) Critical facilities and infrastructure (5 credits)
(4) The community's economy and tax base (5 credits)
(5) Number and type of affected buildings (5 credits) 5c. Review of all damaged buildings/flood insurance claims (5 credits) 5d. Areas that provide natural floodplain functions (5 credits)

CRS Activity 510 Planning Process- Credit Checklist
5e. Development/redevelopment/Population Trends (7 credits) 5f. Impact of future flooding conditions outlined in Step 4, item c (8 credits)
Source: FEMA NFIP CRS Coordinator's Manual (2017), 2021 Addendum

3.1 Overview

Hazard identification is the process of recognizing any natural events that may threaten an area. Natural hazards result from uncontrollable or unexpected natural events of sufficient magnitude. This plan does not include any man-made (other than High-Hazard Potential Dams), technological, or terrorism related hazards. Historical hazards are noted, but all natural hazards that have the potential to affect the study area are considered.

A hazard analysis includes the identification, screening, and profiling of each hazard.

Hazard profiling entails describing hazards in terms of their nature, history, location, magnitude, frequency, extent, and probability. Hazards are identified through historical and anecdotal information collected by members of the community, previous mitigation plans, studies, and study area hazard map preparations/reviews, when appropriate. Hazard maps are then used to define the geographic extent of a hazard, as well as define the approximate boundaries of the risk area.

3.2 Hazard Identification and Screening

The 2018 Coventry Hazard Mitigation Plan and the 2024 State of Rhode Island Hazard Mitigation Plan were used as a starting point for identifying hazards that pose a threat to the Town of Coventry. Some standalone hazards identified in the 2018 HMP were combined into a single hazard profile to align with the 2024 State of Rhode Island HMP. These are noted below.

The following table summarizes the hazards and their impact on the Town of Coventry identified by the Planning Team. This HM&FMP will focus on natural hazards.

Table 6- Hazards Identified by the Coventry Hazard Mitigation Plan Committee

Natural Hazard	Updated from the 2018 HMP or new hazard?	Hazard Applicability
Climate Change	Updated- influence incorporated into each hazard	Temperatures in Rhode Island have risen almost 4°F since the beginning of the 20th century. Total annual precipitation for Rhode Island has generally been above average in recent decades. Extreme weather events common to Rhode Island include severe storms (coastal, winter, and thunderstorms), often accompanied by flooding, and on occasion, tropical storms, and hurricanes.
High Winds	Updated- incorporated into the Severe Thunderstorm profile	All of Coventry is susceptible to impacts from severe thunderstorms. The entire State of Rhode Island falls in the 18-27 thunderstorms per year category and Coventry falls in the category of 2-4 lightning strikes per square kilometer per year.
Lightning	Updated- incorporated into the Severe Thunderstorm profile	
Hail	Updated- incorporated into the Severe Thunderstorm profile	
Dam Failure	Updated	There are 6 High Hazard dams and 6 Significant Hazard dams in Coventry.

Natural Hazard	Updated from the 2018 HMP or new hazard?	Hazard Applicability
		A High Hazard dam is one whose failure or mis-operation will result in a probable loss of human life. A Significant Hazard dam is one whose failure or mis-operation results in no probable loss of human life but may cause major economic loss, disruption of lifeline facilities or impact other concerns detrimental to the public's health, safety, or welfare.
Flooding	Updated	Coventry is threatened by riverine, urban, and flash flooding. Coventry is located over 18 miles inland and is not directly threatened by storm surge or sea level rise.
Riverine Erosion	New	This hazard was added as Coventry is experiencing erosion from heavy rain/ flooding events, which has caused road and bridge damage and closures. Riverbanks are also beginning to erode due to increased water levels in the stream or river.
Hurricanes	Updated- combined with Nor'easter into Tropical and Extratropical Storms profile	Although Coventry is not a coastal community, the Town's relative proximity to the Atlantic Ocean renders it particularly susceptible to hurricanes and Nor'easter, which may result in the loss of human life and property. All of Coventry is susceptible to the impacts of a hurricane or Nor'easter.
Nor'easter	Updated- combined with Hurricanes into Tropical and Extratropical Storms profile	
Snow Storm	Updated- combined to Severe Winter Weather profile	Coventry is impacted annually by snow and ice storms. These events regularly cause downed powerlines which result in power outages for hours to days at a time. On average, Coventry receives 25-30 inches of snow per year. Ice storms pose driving hazards due to unsafe road conditions.
Ice Storm	Updated- combined to Severe Winter Weather profile	
Brushfire	Updated	The forested areas of Coventry are at the highest risk of fire.
Drought	Updated	All of Coventry is susceptible to droughts.
Extreme Temperatures	Updated	Extreme high/cold temperatures could have a serious impact on private and public structures, as well as the general population throughout Coventry. Those most at risk to extreme temperatures are the elderly and those who work outside.
Tornadoes	Updated	Tornadoes have not historically severely impacted Coventry, but the Planning Team noted that tornadoes are increasing in frequency in Rhode Island. Available historical tornado data suggests that Rhode Island can expect future tornadoes to range from EF0 to EF2 on the Enhanced Fujita Scale.
Earthquake	Updated	Rhode Island is located in the North Atlantic tectonic plate and is in a region of historically low seismicity. Structures in Coventry may be particularly vulnerable to the effect of a moderate to large earthquake as seismic design criteria are not required for either new building construction or old building renovation. Buildings that are most at risk from earthquakes are the old masonry buildings and large structures such as those in the Historic Districts.

3.2.1 Hazards Not Profiled in this HM&FMP Update

- Coastal Flooding/Storm Surge: Coastal flooding/storm surge is not included in this HM&FMP due to Coventry's inland location in central western Rhode Island.
- Coastal Erosion: Coastal erosion is not included in this HM&FMP due to Coventry's inland location in central western Rhode Island. Coventry is threated by riverine erosion, which is profiled in this HM&FMP.

3.3 Hazard Profiles

The natural hazards selected by the CEMA Planning Team for profiling have been examined based on the following factors:

- Description (description of the hazard)
- History (previous occurrences)
- Location (hazard areas)
- Extent (magnitude and severity)
- Impact (general impacts associated with each hazard)
- Probability of Future Occurrence (annual likelihood of hazard occurring)
- Future Conditions Including Climate Change (how climate change is influencing the hazard, changes in future population patterns, and future land use development)

Each hazard is assigned a rating based on the following criteria for magnitude/severity (Table 7) and probability of future events (Table 8). Estimating magnitude and severity are determined based on historic events using the criteria identified in the following tables, which are consistent with the State of Rhode Island 2024 HMP Update.

Table 7- Hazard Magnitude/Severity Criteria

Magnitude/ Severity	Criteria
Significant	• Multiple deaths and severe injuries • Medium shutdown of some critical infrastructure and facilities • 20% to 50% of residential and 10-25% of commercial structures are severely damaged • Large impacts to local operations for long amounts of time
Limited	• Some injuries • Short shutdown of some critical infrastructure and facilities • Fewer than 10% of residential and commercial structures damaged • Small number of local operations impacted for short amounts of time
Negligible	• Minor injuries • No shutdown of critical infrastructure and facilities • Scattered incidental residential and commercial structure damages • Few or no operations impacted for short amounts of time

Table 8- Hazard Probability of Future Events Criteria

Probability	Criteria
Highly Likely	• Greater than 90% annual probability of occurring.
Likely	• Between 50-89.9% annual probability of occurring.
Possible	• Between 1-49.9% annual probability of occurring.
Unlikely	• Less than 1% annual probability of occurring.

The hazards profiled for the Town of Coventry are presented throughout the remainder of this section. The presentation order does not signify their importance or risk level.

3.3.0 Climate Change

To meet updated FEMA guidelines, the Planning Team decided to incorporate the influence of climate change into each individual hazard rather than profile it as standalone hazard. General background information regarding climate change in Rhode Island is described below.

The NOAA National Centers for Environmental Information State Climate Summaries 2022 for Rhode Island (NCEI 2022) states:

Rhode Island's geographic position in the mid-latitudes often places it near the jet stream, particularly in the late fall, winter, and spring. The state's frequently changing weather is a result of the regular passing of low-pressure storms associated with the jet stream. In addition, Rhode Island's location on the East Coast of North America exposes it to the cold winter and warm summer air masses of the continental interior and the moderate and moist air masses of the western Atlantic Ocean. In winter, the contrast between the frigid air masses of the continental interior and the relatively warm Atlantic Ocean provides the energy for occasional intense storms known as nor'easters. In Providence, average temperatures in July are around 74°F and in January about 29°F. Statewide annual average precipitation is about 46 inches. The driest year on record (28 inches of precipitation) was 1965, while the wettest year on record (63 inches of precipitation) was 1972. Average accumulated snowfall ranges from 20 inches on Block Island and along the southeastern shores of Narragansett Bay to between 40 and 55 inches in the western portion of the state.

Temperatures in Rhode Island have risen almost 4°F since the beginning of the 20th century. The number of hot days has been above the long-term average since the 1990s with the greatest number occurring during the most recent 6-year period of 2015–2020. The greatest number of warm nights also occurred during the 2015–2020 period. Very cold nights have been mostly below average since the mid-1980s, and the most recent 6-year period (2015–2020) was about average.

Total annual precipitation for Rhode Island has generally been above average in recent decades. The driest multiyear periods were the 1940s and the latter half of the 1960s and the wettest period was the 2000s, although precipitation has been predominantly above average since the 1970s. The driest consecutive 5 years was the 1962–1966 interval, and the wettest 5-year period was 2005–2009, with an annual average of 54 inches of precipitation, which was about 8 inches more than the long-term average. Since 2000, summer precipitation was above average until the most recent 6-year period (2015–2020), which was below average. Rhode Island experienced the largest number of 2-inch extreme precipitation events in the 10-year period of 2005–2014. In 2010, major rainfall from a nor'easter in late March caused the worst flooding in the state's history. This event set an all-time monthly precipitation record in Providence of 16.34 inches, superseding the previous record of 15.38 inches, which was recorded in October 2005. The flooding of 2010 resulted in an estimated $43 million in national flood insurance claims in the state. Rhode Island experienced severe drought in 2016 and extreme drought in 2020, straining water supplies.

Extreme weather events common to Rhode Island include severe storms (coastal, winter, and thunderstorms), often accompanied by flooding, and on occasion, tropical storms, and hurricanes. The state's coastline is highly vulnerable to flood damage from winter and hurricane events. FEMA disaster declarations were sought 4 out of the last 10 years. Landfalling hurricanes produced hurricane-force winds in Rhode Island 6 times from 1900 to 2019. The Great New England Hurricane (Category 3) of 1938 was one of the most destructive and powerful storms ever to impact southern New England. Storm tides of 12 to 15 feet were recorded for Narragansett Bay, and downtown Providence was submerged under a storm tide of 20 feet. In October 2012, Superstorm Sandy (a post-tropical storm) caused a storm surge 9.4 feet above normal high tide in Providence, resulting in extensive coastal flooding. One year earlier, Hurricane

Irene brought heavy rainfall and strong southeast winds of up to 70 mph, knocking down power lines and leaving half of Rhode Island's one million residents without power. Both hurricanes demonstrated the region's vulnerability to extreme weather events. (NCEI 2022)

3.3.1 Severe Thunderstorm (High Wind, Lightning, Hail)

This hazard profile includes information on high wind, lightning, and hail events

3.3.1.1 Description

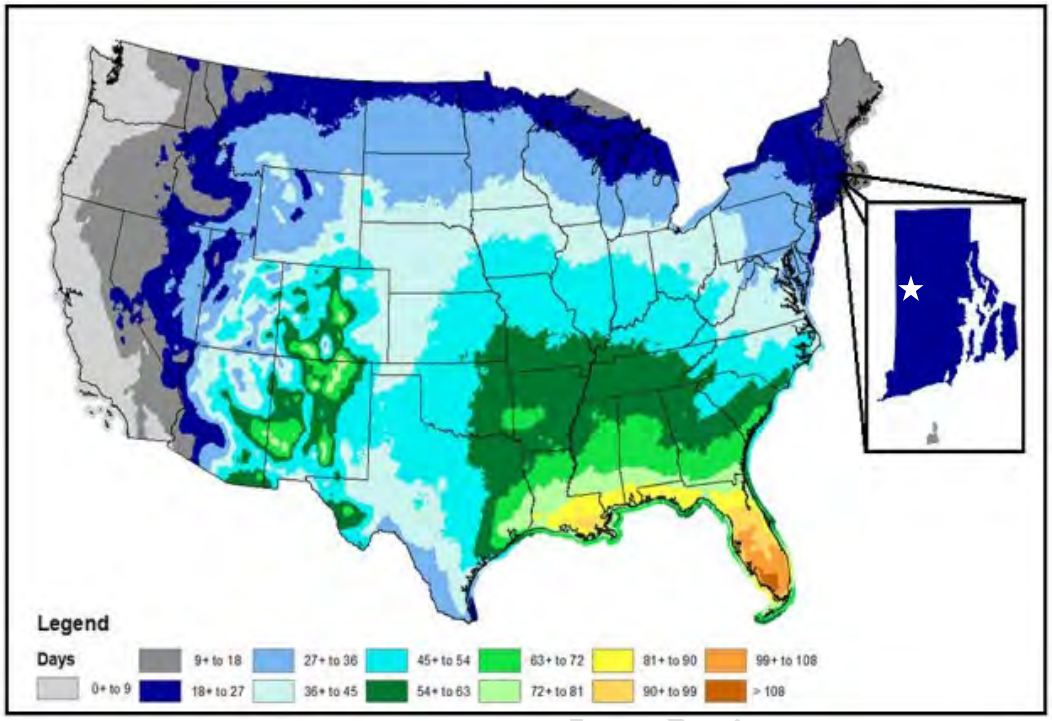
Thunderstorms are formed when the right atmospheric conditions combine to provide moisture, lift, and warm unstable air that can rise rapidly. Thunderstorms occur any time of the day and in all months of the year but are most common during summer afternoons and evenings and in conjunction with frontal boundaries. The NWS classifies a thunderstorm as severe if it produces hail at least one inch in diameter, winds of 58 mph or greater, or a tornado. About 10% of the estimated 100,000 annual thunderstorms that occur nationwide are considered severe. Thunderstorms affect a smaller area compared with winter storms or hurricanes, but they can be dangerous and destructive for a number of reasons. Storms can form in less than 30 minutes, giving very little warning; they have the potential to produce lightning, hail, tornadoes, powerful straight-line winds, and heavy rains that produce flash flooding.

High Wind	Wind is the movement of air caused by a difference in pressure from one place to another. Local wind systems are created by the immediate geographic features in a given area such as mountains, valleys, or large bodies of water. National climatic events such as high gale winds, tropical storms, thunderstorms, Nor'easters, hurricanes, and low-pressure systems produce wind events in Rhode Island. Wind effects can include blowing debris, interruptions in elevated power and communications utilities, and intensification of the effects of other hazards related to winter weather and severe storms.
Lightning	All thunderstorms contain lightning. Lightning is a giant spark of electricity in the atmosphere between clouds, the air, or the ground. In the early stages of development, air acts as an insulator between the positive and negative charges in the cloud and between the cloud and the ground. When the opposite charges build up enough, this insulating capacity of the air breaks down and there is a rapid discharge of electricity that we know as lightning. The flash of lightning temporarily equalizes the charged regions in the atmosphere until the opposite charges build up again. Lightning can occur between opposite charges within the thunderstorm cloud (intra-cloud lightning) or between opposite charges in the cloud and on the ground (cloud-to-ground lightning).
Hail	Hail is a form of precipitation consisting of solid ice that forms inside thunderstorm updrafts. Eventually, these ice particles become too heavy for the updraft to hold up, and they fall to the ground at speeds of up to 120 mph. In the United States, hail causes billions of dollars in damage to property each year (RIEMA 2024). Vehicles, roofs of buildings and homes, and landscaping are most commonly damaged by hail. Hail has been known to cause injury and the occasional fatality to humans, often associated with traffic accidents.

3.3.1.2 Location

All of Coventry is susceptible to high wind, lightning, and hail.

Figure 2 shows the nationwide average number of thunderstorm days from 1993 through 2018. The entire State of Rhode Island falls in the 18-27 thunderstorms per year category.



Source: NOAA 2023b

Figure 2- Annual Average Thunderstorm Days in Rhode Island (1993-2018)

Figure 3 depicts the average annual lightning events per square kilometer per year, from 2016 through 2022. Coventry falls in the category of 2-4 strikes per square kilometer per year.

Source: Vaisala per RIEMA 2024

Figure 3- Average Annual Lightning Events per Square Kilometer per Year (2016-2022)

3.3.1.3 Extent

High Wind	The Beaufort Wind Scale (Table 9) is a 13-level scale used to describe wind speed and observed wind conditions at sea and on land. A wind classification of 0 has wind speeds of less than 1 mile per hour (mph) and winds are considered calm. On the other end, a classification of 10 with wind speeds reaching 63 mph can blow down trees and cause considerable damage. Wind gusts of nearly 60 mph have been recorded in Coventry. Based on the extent of past events and the criteria identified in Table 7, the extent of high winds in Coventry is considered **Limited**, with potential for some injuries; short shutdown of some critical infrastructure and facilities; fewer than 10% of residential and commercial structures damaged; and a small number of local operations impacted for short amounts of time.
Lightning	There is no universally accepted standard for measuring the strength or magnitude of lightning. Similar to modern tornado characterizations, lightning events are often measured by the damage they produce. Building construction, location, and nearby trees or other tall structures will have a large impact on how vulnerable an individual facility is to a lightning strike. A rough estimate of a structure's likelihood of being struck by lightning can be calculated using the structure's ground surface area, height, and striking distance between the downward-moving tip of the stepped leader (negatively charged channel jumping from cloud to earth [the initial streamer of a lightning discharge]) and the object. In general, buildings are more likely to be struck by lightning if they are located on high ground or if they have tall protrusions such as steeples or poles which the stepped leader can jump to. There is currently no scale to indicate the severity of a lightning strike, but data from NOAA indicates that there approximately 25,000,000 cloud-to-ground lightning strikes per year in the United States (RIEMA 2024). Based on the extent of past events and the criteria identified in Table 7, the extent of lightning/thunderstorms in Coventry is considered **Limited**, with potential for some injuries; short shutdown of some critical infrastructure and facilities; fewer than 10% of residential and commercial structures damaged; and a small number of local operations impacted for short amounts of time.
Hail	Hail falls along paths called swaths, which can vary from a few square acres to up to 10 miles wide and 100 miles long. Hail larger than 0.75 inch in diameter can do great damage to both property and crops, and some storms produce hail over two inches in diameter. Table 10 provides the size and descriptions of hail. Hail in Coventry is usually 1 inch in diameter or smaller. Based on the extent of past events and the criteria identified in Table 7, the extent of hail in Coventry is considered **Negligible** with the potential for minor injuries; no shutdown of critical infrastructure and facilities; scattered incidental residential and commercial structure damages; and few or no operations impacted for short amounts of time.

Table 9- Beaufort Wind Scale

Force	Speed (mph)	Description	Impacts on land
0	0-1	Calm	Calm: smoke rises vertically.
1	1-3	Light Air	Direction of wind shown by smoke drift, but not by wind vanes.
2	4-7	Light Breeze	Wind felt on face; leaves rustle; ordinary vanes moved by wind.
3	8-12	Gentle Breeze	Leaves and small twigs in constant motion; wind extends light flag.
4	13-18	Moderate Breeze	Raises dust and loose paper; small branches are moved.

Force	Speed (mph)	Description	Impacts on land
5	19-24	Fresh Breeze	Small trees in leaf begin to sway; crested wavelets form on inland waters.
6	25-31	Strong Breeze	Large branches in motion; whistling heard in telegraph wires; umbrellas used with difficulty.
7	32-38	Near Gale	Whole trees in motion; inconvenience felt when walking against the wind.
8	39-46	Gale	Breaks twigs off trees; generally, impedes progress.
9	47-54	Severe Gale	Slight structural damage occurs (chimneypots and slates removed)
10	55-63	Storm	Seldom experienced inland; trees uprooted; considerable structural damage occurs.
11	64-72	Violent Storm	Very rarely experienced; accompanied by wide-spread damage.
12	72-83	Hurricane	Equivalent to a Category 1 Hurricane

Table 10- Hail Size

Hail Size and Description	
1/4" Pea Size	1 3/4" Golf Ball Size
1/2" Mothball Size	2" Hen Egg Size
3/4" Penny Size	2 1/2" Tennis Ball Size
7/8" Nickel Size	2 3/4" Baseball Size
1"Quarter Size	3" Teacup Size
1 1/4" Half Dollar Size	4" Grapefruit Size
1 1/2" Ping Pong Ball Size	4 1/2" Softball Size

RIEMA states that Coventry has the following planning significance related to severe thunderstorm:

Jurisdiction	Hail NRI	Hail EAL	Lightning NRI	Lightning EAL	Strong Wind NRI	Strong Wind EAL
Coventry	Very Low	Very Low	Relatively Moderate	Relatively Moderate	Relatively Low	Relatively Low

Source: RIEMA 2024 NRI: National Risk Index EAL: Expected Annual Loss

3.3.1.4 History

Table 11 identifies historical severe thunderstorm events (high wind, lightning, hail) in Coventry from 1996 through March 2024.

Since the 2018 HMP, there has been 3 strong wind events in Coventry.

Table 11- History of Severe Thunderstorms (High Wind, Lightning, and Hail) in Coventry

Date	Event Type	Event Description
3/6/1997	Strong Wind	High winds, with gusts reaching 50 to 62 mph from the west and northwest, occurred across the state in the wake of strong low pressure that passed through New England and into the Gulf of

Date	Event Type	Event Description
		Maine. Wind speeds increased dramatically around mid-morning and the strongest winds occurred during the afternoon. Buildings and vehicles were damaged by falling trees and tree limbs in many communities throughout the state. In Burrillville and Glocester, houses were damaged by falling trees and in Chepachet, a parked car was set afire by a falling power line. Part of a roof was blown off a school in Providence. Up to 11,800 electric customers were without power during the afternoon, but only a couple of thousand remained without power by early evening. Some peak gusts reported around the state included: Coventry, 57 mph.
3/8/1998	Heavy Rain	A powerful storm system moving slowly toward the northeast from the Ohio Valley to the eastern Great Lakes brought strong winds and heavy rainfall to Rhode Island, resulting in urban street flooding, basement flooding, and river flooding. The Blackstone River at Woonsocket crested at 10.3 feet on March 10th at 6:00 PM; flood stage is 9.0 feet. Urban flood control systems prevented any flooding in the city. Several parking lots were reported flooded with up to 3 feet of water along the Blackstone River in Cumberland. At times the rainfall was torrential, especially in thunderstorms during the evening on March 9th. Some of the maximum rainfall totals across the state included Coventry.
1/18/1999	Strong Wind	Strong south winds gusted to 55 mph ahead of an approaching cold front. Gusts of 46 mph were reported in Coventry.
2/2/1999	Heavy Rain	A low pressure system moved from the Carolinas to southern New England, bringing strong southeast winds and over two inches of rain. As much as 2.83 inches of rain fell in Coventry.
3/22/1999	Strong Wind	An intensifying low pressure system moved up the Hudson Valley, and brought strong southerly winds to Rhode Island. Gusts of 49 mph were reported in Coventry.
1/18/2006	High Wind	An intensifying low pressure system moved across the Great Lakes and into Quebec, producing strong damaging winds across Rhode Island on 18 January 2006. Sustained winds of 33 MPH at 1:14 PM and 36 MPH at 1:04 PM were measured at the Newport and Manchester airports, respectively. In addition, winds gusted to as high as 59 MPH at 11:45 AM in North Foster. Two large trees and limbs were blown down in Coventry. No known injuries directly resulted from this storm.
1/25/2010	High Wind	Unseasonably warm temperatures moved into southern New England ahead of a cold front which allowed for excellent atmospheric mixing. This resulted in strong to damaging winds across much of eastern Massachusetts and Rhode Island. Many trees were downed in Coventry.
1/31/2013	High Wind	A warm front moved northward across southern New England. This brought a period of mainly rain and warm temperatures. In addition, a strong low level jet (up to 80 kts) resulted in high winds across much of southern New England. There was some tree damage and downed power lines with winds gusting to 60 to 70 mph. An amateur radio operator recorded a wind gust to 52 mph on their home weather station in Coventry.
3/17/2015	Strong Wind	An arctic cold front moving into southern New England brought rain and snow showers to the region, followed by strong, damaging winds. A tree was downed onto Terrace Avenue in Coventry, blocking the road.
3/17/2016	Strong Wind	An upper level disturbance coupled with cold air aloft and moving into southern New England set off a complicated mix of showers and thunderstorms and non-convective winds. All efforts were made to separate out the non-convective winds from the thunderstorm winds. A large branch was downed onto wires on Red Maple Drive in Coventry.

Date	Event Type	Event Description
2/25/2019	Strong Wind	A storm moving north through the Great Lakes redeveloped along the Mid Atlantic coast on the 24th, then moved up the coast past Southern New England. This coastal storm brought damaging west-northwest winds to Rhode Island as it moved off through the Maritimes on the 25th. At 2:40 PM EST a tree fell on a house on Wood Cover Drive in Coventry. One person was trapped in the debris.
1/16/2020	Strong Wind	Low pressure moved into interior New England on the 16th spreading a warm front early in the morning across northern Massachusetts with wintry precipitation transitioning to rain. A strong cold front then ushered in windy and much colder weather behind it which caused some minor damage. An amateur radio operator reported a large branch down blocking Phillips Hill Rd in Coventry.
3/1/2021	Strong Wind	An arctic cold front moved through southern New England on the afternoon of March 1st. It was followed by very strong/damaging west-northwest winds, which continued through much of the night and into the early morning hours on March 2nd. There were several reports of downed trees in northern Rhode Island. Winds generally were gusting to 50 to 55 mph across western Kent County. At the nearby North Central State Airport, the ASOS (KSFZ) recorded a wind gust to 55 mph at 1256 AM EST on March 2nd and a T.F. Green Airport (KPVD), there was a 49 mph gust on the ASOS at 451 AM EST. At 1034 PM EST on March 1st in Coventry, a tree was down on Hill Farm Road.

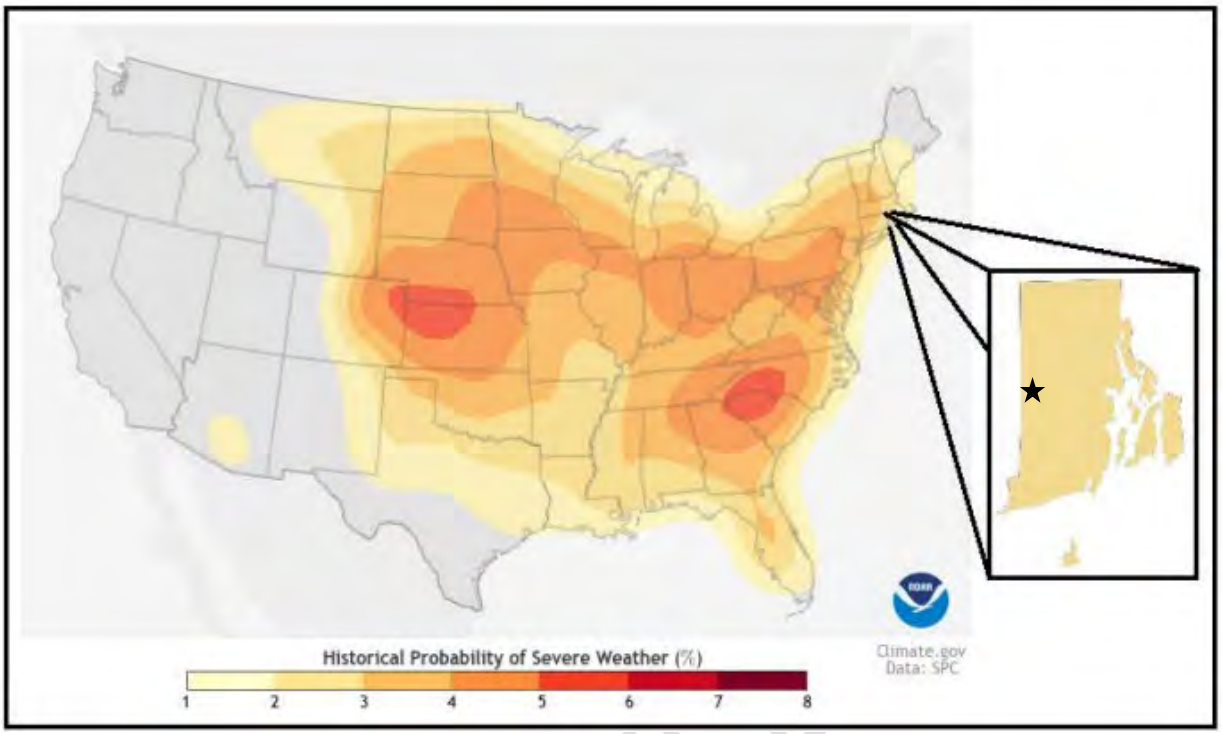
3.3.1.5 Impact

High Wind	Strong wind gusts of 40 mph (Beaufort Scale of 8) can blow twigs and small branches from trees. Occasional gusts and sustained winds at this speed (and above) are of concern to the Town. Damages from wind events range from power outages, property damage to vehicles and buildings and fallen trees/limbs. Wind events in Coventry have resulted primarily in power outages and downed tree limbs on local and State roads with minimal property damage. It is important that the Town of Coventry maintain their public tree trimming program that will reduce the likelihood of fallen trees/limbs from disrupting transportation routes and/or taking down power lines. Past high wind events in Coventry have caused downed trees, downed power lines, loss of electricity, and injuries and damages from falling trees.
Lightning	Lightning can strike buildings and accessory structures, often causing structure fires. Electrical and communications utilities are also vulnerable to direct lightning strikes. Damage to these lines has the potential to cause power and communication outages for businesses, residencies, and critical facilities. Additionally, dead trees are more likely to catch fire if struck by lightning and can quickly catch fire. Past lightning and thunderstorms in Coventry have resulted in downed power lines and trees.
Hail	Structure vulnerability to hail is determined mainly by construction and exposure. Metal siding and roofing is better able to stand up to the damages of a hailstorm than many other materials, although it may also be damaged by denting. Exposed windows and vehicles are also susceptible to damage. Crops are extremely susceptible to hailstorm damage, as even the smallest hail stones can rip apart unsheltered vegetation. Human vulnerability is largely determined by the availability and reception of early warnings for the approach of severe storms, and by the availability of nearby shelter. Swimming, boating, and fishing are particularly dangerous during periods of frequent lightning strikes, which can also cause power outages, topple trees, and spark fires. Individuals who immediately seek shelter in a sturdy building or metal- roofed vehicle are much safer than those who remain outdoors. Early warnings of severe storms are also vital for aircraft flying through the area. Past hail events in Coventry have not caused significant damage.


Figure 4- Downed Trees in Coventry from High Winds

3.3.1.6 Probability of Future Occurrence

High Wind	Coventry experiences high wind events annually. Based on previous occurrences and the criteria identified in Table 8, it is **Highly Likely** that Coventry will experience a high wind event within the calendar year; there is a greater than 90% annual probability of occurring.
Lightning	NOAA's National Severe Storms Laboratory (NSSL) uses multiple tools to forecast thunderstorms. Their Storm Prediction Center in Oklahoma monitors and forecasts the potential for severe weather across the continental U.S. Using computer forecast models, ensemble forecasting (when the weather becomes atypical), and satellite images, the Storm Prediction Center informs of severe weather conditions. Data from NOAA indicates that Rhode Island can expect between 18 to 27 thunderstorms per year (RIEMA 2024). Figure 5 provides a snapshot for the probability of a severe weather event on a summer day. Based on previous occurrences and the criteria identified in Table 8, it is **Highly Likely** that Coventry will experience a lightning event within the calendar year; there is a greater than 90% annual probability of occurring.
Hail	Based on previous occurrences and the criteria identified in Table 8, it is **Possible** that Coventry will experience a hail event in the calendar year; there is a between 1-49.9% annual probability of occurring.



Source: RIEMA 2024

Figure 5- Rhode Island Historic Probability of Severe Weather (Thunderstorm) on a Summer Day

3.3.1.7 Future Conditions Including Climate Change

High Wind	Nature of the hazard	Climate change is not likely to influence the nature of future high wind events in Coventry.
	Location	Climate change is not likely to influence the location of future high wind events in Coventry.
	Extent	Table 12 shows Coventry's historical and future projections for wind speed under different climate change models. These models indicate that it is unlikely that climate change will influence the extent of future wind speeds.

Table 12- ClimRR Climate Projection Report-Wind Speed

Wind_Speed	Hist.	Mid-Century RCP 4.5	Mid-Century RCP 8.5	End-Of-Century RCP 4.5	End-Of-Century RCP 8.5
ANNUAL					
Wind Speed (Mph)	7.51	7.48	7.51	7.64	7.41

Source: Climate Risk and Resilience Portal (ClimRR) 2024

Mid-Century Wind Analysis: The historical annual average wind speed is 7.51 mph. Under RCP 4.5, the annual average wind speed at mid-century is 7.48 mph which represents a -0.03 mph change from the baseline. Under RCP 8.5, the annual average wind speed at mid-century is 7.51 mph which represents a -0.00 mph change from the baseline.

		End-Century Wind Analysis: The historical annual average wind speed is 7.51 mph. Under RCP 4.5, the annual average wind speed at end-century is 7.64 mph which represents a 0.13 mph change from the baseline. Under RCP 8.5, the annual average wind speed at end-century is 7.41 mph which represents a -0.10 mph change from the baseline.
	Impact	As Coventry's future projected wind speeds are relatively similar to the historical speeds, it is not likely that future impacts will be significantly different than current impacts from high wind events.
	Probability of Future Events	The probability of experiencing damaging winds is increasing with climate change in those areas of the US that are impacted by tropical storm systems. However, based on climate change models (Table 12), in Coventry, future projected wind speeds are relatively similar to the historical speeds, it is not likely that future impacts will be significantly different that current impacts from high wind events.
	Changes in population patterns	It is unlikely that future high wind events will cause changes in population patterns in Coventry.
	Changes in land use development	It is unlikely that future high wind events will cause changes in land use development in Coventry.
Lightning	Nature of the hazard	Climate change is not likely to influence the nature of future lightning events in Coventry.
	Location	Climate change is not likely to influence the location of future lightning events in Coventry. The entire Planning Area is susceptible to lightning events.
	Extent	Climate change is not likely to alter the severity of lightning strikes, but more lightning strikes is likely.
	Impact	As the probability of lightning strikes is likely to increase, potential impacts to Coventry are likely to increase. Potential increased impacts include increased potential of wildfires, down trees leading to power outages, and lightning strikes.
	Probability of Future Events	For every 1°C of warming, lightning activity may increase by 12%. This could lead to a 50% increase in lightning strikes in the United States by the end of the century. Warmer air can hold more moisture, which increases the likelihood of thunderstorms. This can lead to more violent storms and more lightning strikes. It is likely that as temperatures increase, more lightning activity occurs.
	Changes in population patterns	It is unlikely that future lightning events will cause changes in population patterns in Coventry.
	Changes in land use development	It is unlikely that future lightning events will cause changes in land use development in Coventry.
Hail	Nature of the hazard	Climate change is possible to influence the nature of future hail events as climate change affects low-level moisture and convective instability, microphysical processes, and vertical wind shear, all of which are relevant to hail formation and properties (Raupach et al. 2021).
	Location	Climate change is unlikely to influence the location of future hail events in Coventry. The entire Planning Area is susceptible to hail events.

	Extent	Climate change is possible to influence the conditions necessary for hail formation within thunderstorms. Warmer temperatures at the surface and greater instability in the atmosphere can contribute to larger and more damaging hailstones (RIEMA 2024).
	Impact	As hail storms are likely to become more frequent and the development of larger hailstones is also likely, future impacts to Coventry from hail events is likely to increase. Larger hailstones will lead to more damage to vehicles, property, and critical facilities.
	Probability of Future Events	As a result of anthropogenic warming, it is likely that low-level moisture and convective instability will increase, raising hailstorm likelihood and enabling the formation of larger hailstones (Raupach et al. 2021).
	Changes in population patterns	It is unlikely that future hail events will cause changes in population patterns in Coventry.
	Changes in land use development	It is unlikely that future hail events will cause changes in land use development in Coventry.

3.3.2 Dam Failure

The Planning Team recognizes that a dam failure is not a natural hazard in itself, but several of the hazards identified in this HM&FMP could influence a dam failure in the Town of Coventry. Additionally, updated FEMA guidelines require that in order for a jurisdiction to be eligible for FEMA's Rehabilitation of High Hazard Potential Dam (HHPD) Grant Program, they must address HHPDs in their Hazard Mitigation Plan.

Note: As of 2024, FEMA is only funding projects for the rehabilitation of HHPDs. The Planning Team chose to include information on the six Significant Hazard dams in Coventry in this section to explore non-FEMA funding available for the rehabilitation of non-HHPDs and in preparation in the event a Significant Hazard dam is reclassified to a HHPD before the next HMP update cycle.

3.3.2.1 Description

A dam is a barrier across flowing water that obstructs, directs, or slows down the flow, often creating a reservoir, lake, or impoundment. Most dams have a section called a spillway or weir, over or through, which water flows, either intermittently or continuously. Dams commonly come in two types, embankment (the most common) and concrete (gravity, buttress, and arch), as well as sizes. They also serve a number of purposes and provide essential benefits, including drinking water, irrigation, hydropower, flood control, and recreation (RIEMA 2024).

Large or small, dams have a powerful presence that is frequently overlooked until a failure occurs. Dams fail in two ways, a controlled spillway release done to prevent full failure, or the partial or complete collapse of the dam itself. In each instance, an overwhelming amount of water, and potentially debris, is released. Dam failures are rare, but when they do occur, they can cause loss of life and immense damage to property, critical infrastructure, and the environment (RIEMA 2024).

Dams are classified as High hazard, Significant hazard, or Low hazard. The classification is not based on whether a dam is deemed safe or unsafe, but rather the impact/magnitude of a potential failure.

- A **High Hazard** dam is one whose failure or mis-operation will result in a probable loss of human life.

- A **Significant Hazard** dam is one whose failure or mis-operation results in no probable loss of human life but may cause major economic loss, disruption of lifeline facilities or impact other concerns detrimental to the public's health, safety, or welfare.
- A **Low Hazard** dam is one whose failure or mis-operation results in no probable loss of human life and low economic losses.

Dams are periodically inspected and given condition ratings. Each dam's hazard classification determines the frequency of inspection. The higher the classification, the more frequently the inspection is conducted. As part of each Rhode Island Department of Environmental Management (RIDEM) inspection, the major components of the dam are subjectively rated as satisfactory, fair, or poor. The major components being inspected are the embankment, the spillway, and the low-level outlet.

The following outlines criteria for a given condition rating.

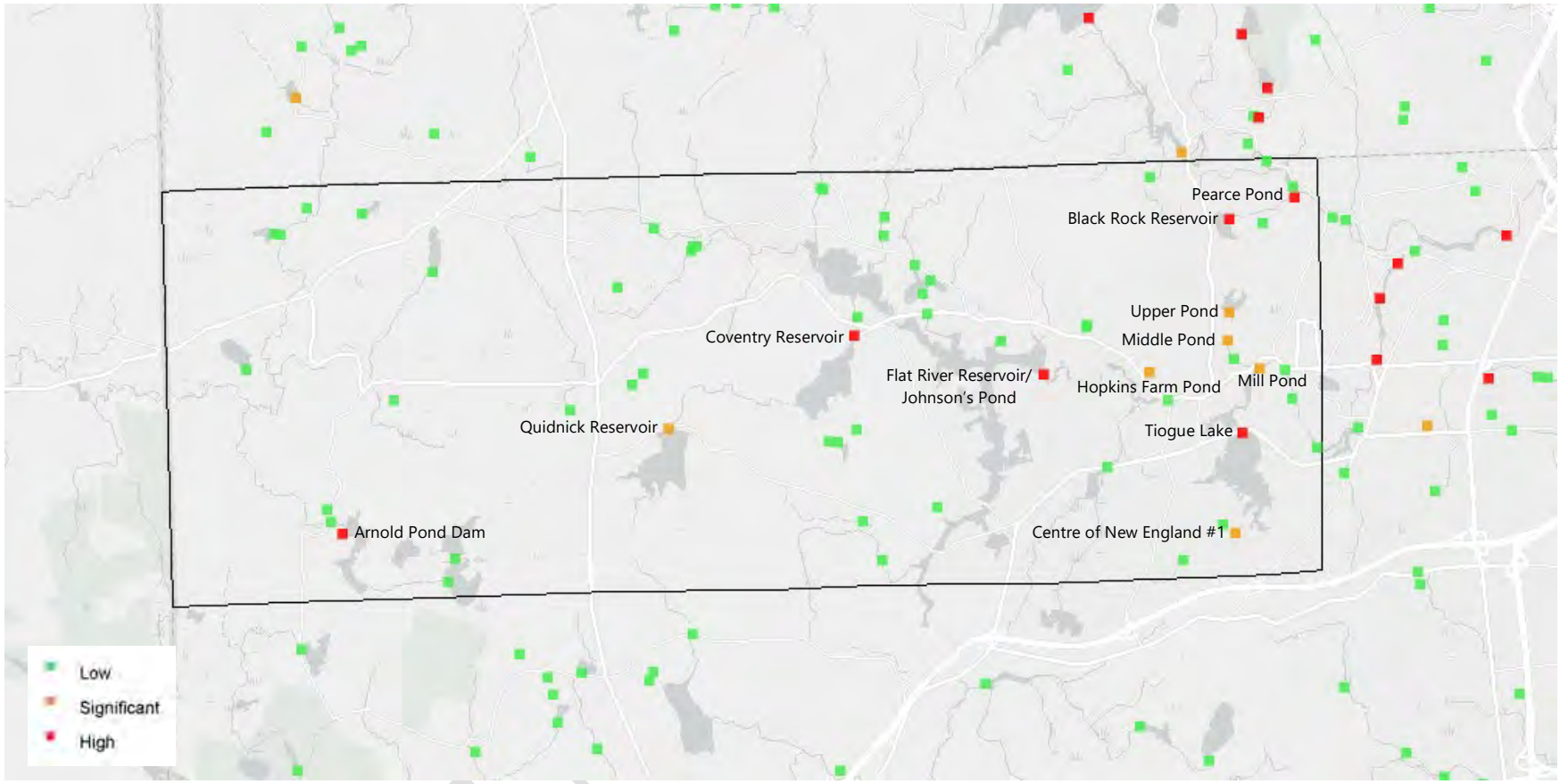
- **Satisfactory**: No existing or potential dam safety deficiencies are recognized.
- **Fair**: No existing or potential dam safety deficiencies are recognized for normal loading conditions. Rare or extreme hydrologic and/or seismic events may result in dam safety deficiency.
- **Poor**: A dam safety deficiency is recognized for loading conditions which may realistically occur. Remedial action is necessary. Poor may also be used when uncertainties exist as to critical analysis parameters which identify a potential dam safety deficient. Further investigations and studies are necessary. A dam safety deficiency is recognized that requires immediate or emergency remedial action for problem resolution.
- **Not rated**: The dam has not been inspected or has been inspected but, for unknown reasons, has not been rated.

The remainder of this hazard profile will focus on the dams where a dam failure may impact human life and critical facilities in Coventry.

3.3.2.2 Location

There are a total of 61 dams in the Town of Coventry (RIEMA 2024). Six (6) are classified as High hazard, six (6) are classified as Significant hazard, and forty-nine (49) are classified as Low hazard.

Figure 6 shows the locations of dams, along with their hazard potential category, in and surrounding Coventry (Rhode Island only).



Source: RIDEM- Dam Safety (ArcGIS Online)

Figure 6- Location of Dams in and Surrounding Coventry

Specifications on the six (6) high hazard and six (6) significant hazard dams in Coventry are below.

167- Flat River Reservoir/Johnson's Pond Dam	
Hazard Classification	High
Owner	Town of Coventry
Year Built	1873
Dam Type/Purpose	The original purpose of the Dam was to impound water for power generation and process use by QRC member industries located downstream. Water impounded by the Dam is currently used for recreation and the water released to the Pawtuxet River is still used by downstream industries. Additionally, impounded and released water is important for the preservation of wetlands and wetland dependent plant and animal species.
Length x Height	750 ft x 24 ft
Drainage Area	57.5 square miles
Last Inspection	2023
Inspection Frequency	2 years
Last Condition Assessment	05/11/2020- Fair
EAP Prepared?	Yes
Downstream Channel	The channel located downstream of the spillway runs along the toe of the north embankment, where it converges with the channel located downstream of the low-level outlet pipes. The right side of the downstream channel consists of a masonry training wall that transitions to an earthen slope further downstream. An earthen slope is also present along the left side of the downstream channel with boulders in some areas. Heavy vegetation including mature trees and undergrowth was observed within the downstream channel which could obstruct flow during a significant storm event. Vegetation is also present behind and in front of the masonry training wall and has dislodged stones in some locations.
Overall assessment of the 2020 inspection	Based on the visual inspection completed, the Flat River Reservoir Dam is considered to be in fair condition.

Source: RIDEM 2020a, RIDEM 2024, NID 2024

176- Coventry Reservoir Dam	
Hazard Classification	High
Owner	Town of Coventry

176- Coventry Reservoir Dam	
Year Built	1875
Dam Type	Rockfill, Masonry, Earth, Gravity
Length x Height	360 ft x 12 ft
Drainage Area	3 square miles
Last Inspection	2020
Inspection Frequency	2 years
Last Condition Assessment	10/03/2017- Fair
EAP Prepared?	No
Downstream Description	Coventry Reservoir Dam is located on Quidnick Brook, which flows through the center of the Town of Coventry. The Brook confluences with Flat River Reservoir approximately 2,000-feet downstream of Coventry Reservoir Dam.
Downstream Area	Immediately downstream of the dam, the discharge channel flows through wooded land for roughly 650 feet where the channel travels beneath RI-117 / Flat River Road and enters an unnamed pond north of Flat River Road. Properties along Old Flat River Road are located within 350 feet of the east side of the downstream channel. The west side of the channel is lightly developed and wooded. Approximately 1,250 feet downstream of the dam, the downstream channel flows under Old Flat River Road, before entering the Flat River Reservoir.
Downstream Dams	Coventry Center Pond Upper Dam (190) is a small, 6-ft high dam located about 800 ft downstream of Coventry Reservoir Dam. Coventry Center Pond Lower Dam (191) is a 9- ft high, 180-ft long masonry and earthen embankment dam, located approximately 1,300-ft downstream of Coventry Reservoir Dam. Flat River Reservoir Dam (167) is a 24-ft high, 750-ft long earthen embankment dam, located approximately 3.2-miles downstream of Coventry Reservoir Dam.
Downstream Bridges	An approximately 5-ft diameter culvert beneath Flat River Road (Route 117) is located approximately 800-ft downstream of Coventry Reservoir Dam. Old Flat River Road is located approximately 1,500-ft downstream of Coventry Reservoir Dam.
Reservoir Area	The Coventry Reservoir Dam impounds water along the Quidnick Brook to form the Coventry Reservoir, also known as Stump Pond, also known as Maroon Swamp. The dam is located at the north end of a long, thin, cove at the northeast side of the impoundment, which is isolated from the majority of the impoundment by a bridge crossing approximately 230 feet upstream. The immediate impounded area (between the dam and the bridge crossing) is approximately 375 feet long along its southwest northeast axis and approximately 100 feet wide along its northwest-southeast axis. The perimeter of the impoundment is generally wooded with the Washington Secondary Trail along the water's south/southeastern edge and the potential dike along the western and northern shoreline. The main area of the impoundment is located approximately 230 feet upstream of the dam,

176- Coventry Reservoir Dam	
	on the south side of the Washington Secondary Trail. This portion of the impoundment is roughly 5,200 feet long and 1,600-feet wide. The shorelines are primarily wooded with some residential structures along the southern edge.
General findings of the 2017 inspection	In general, Coventry Reservoir Dam has unwanted woody vegetation, erosion of the upstream slope both left and right of the spillway, an inoperable low level outlet, areas of uncontrolled seepage, missing chinking stones throughout the wall systems, displaced capstones along the spillway crest, and other dam safety deficiencies.
Potential Effects of a Dam Break	Results of the analysis indicate a peak flood depth at the immediate toe of the dam of about 7.5 feet and a peak flow of approximately 3,300 cfs. The peak flood flow is expected to attenuate as it travels downstream, and the peak flood depths at the headwaters of Flat River Reservoir are expected to be about 1.2 feet higher than normal. Coventry Center Upper and Lower Pond Dams would likely be overtopped as a result of the flood wave, and Route 117 and Old Flat River Road may each be overtopped and possibly washed out.
Recommended Hazard Potential Classification	GZA recommends that Coventry Reservoir Dam be classified as High Hazard based on the aforementioned analyses, site/downstream valley reconnaissance, site-specific GIS mapping and other existing data, and professional judgment. A potential dam failure of Coventry Reservoir Dam would result in probable loss of human life, cause major economic loss, and disruption of area roadways. The renovated mill structure adjacent to Quidnick Brook near Flat River Road (Route 117) appears to be particularly vulnerable to the potential dam break flood. Flooding of the structure is anticipated to jeopardize human lives. Small mill dams downstream of Coventry Reservoir Dam would likely be heavily damaged or destroyed as a result of the flood wave, and Route 117 and Old Flat Rock Road may each be overtopped and possibly washed out.

Source: RIDEM 2002a, RIDEM 2017, RIDEM 2021a, NID 2024

177- Tiogue Lake Dam	
Hazard Classification	High
Owner	Denise Oneppo
Year Built	1875
Dam Type	Masonry, Earth, Gravity
Length x Height	1,400 ft x 15 ft
Drainage Area	2 square miles
Last Inspection	2023
Inspection Frequency	2 years
Last Condition Assessment	10/03/2017- Fair

177- Tiogue Lake Dam	
EAP Prepared?	No
Downstream Description	Tiogue Lake Dam outflows to the Tiogue River, just upstream of the South Branch of the Pawtuxet River, through the Towns of West Warwick and Coventry. The immediate downstream area consists of property occupied by various commercial establishments, some residences, and State Route 3. Some of these structures occupy the downstream face of the dam.
Downstream Area	Immediately downstream of the dam is RI-3 / Tiogue Avenue, a heavily travelled public road which the downstream channel travels beneath. Downstream of the Tiogue Avenue culvert, the downstream channel travels for approximately 300 feet within a wetland area and into a small unnamed body of water. From here flows enter the South Branch Pawtuxet River 1000-feet downstream of the dam.
Downstream Dams	There are several dams on the South Branch of the Pawtuxet River, downstream of the confluence of the Tiogue River, that are not expected to affect the hazard classification of Tiogue Lake Dam, in GZA' s opinion.
Downstream Bridges	There are no bridges over the South Branch of the Pawtuxet River, downstream of the dam, expected to affect the hazard classification of Tiogue Lake Dam, in GZA's opinion.
Reservoir Area	The dam is located along the northern shoreline of an irregularly oblong shaped impoundment. The reservoir surface area is 267 acres according to the National Inventory of Dams Database. The perimeter of the impoundment is generally abutted by light to medium residential developments, except for wooded land to the southeast and commercial properties to the north. RI-3 abuts the impoundment and dam to the north and Arnold Road travels near the impoundment to the west. Water generally enters the impoundment from the west and south.
Downstream Development	The land use of the floodplain of the Tiogue River is predominantly commercial. Several commercial establishments, residences, and office parks are located along Route 3 and immediately adjacent to the downstream face of the dam.
General findings of the 2019 inspection	In general, Tiogue Lake Dam was found to be have sections of overgrown upstream slope, crest and downstream wall; voids developing along the right training wall; an undefined and overgrown downstream channel culvert; sections of crest being used by private residences; areas of seepage along the toe of wall/slope at several locations; non-uniform crest elevation; non-uniform slope protection; a low-level outlet that cannot reliably operate along the full range of motion; and other dam safety deficiencies.
Potential Effects of a Dam Break	Results of the analysis indicate a peak flood depth at the immediate toe of the dam of about 5 feet. As the flood wave progresses downstream, it is expected to attenuate. Thus, peak flood flows are predicted to decrease from 7,800 cfs to about 6,400 cfs at the downstream study limit. However, most of the damage as a result of the dam break would occur at the toe of the dam and along Route 3, which is immediately downstream of the dam.
Recommended Hazard Potential Classification	GZA recommends that Tiogue Lake Dam be classified as High Hazard based on the aforementioned analyses, site/downstream valley reconnaissance, site-specific GIS mapping .and other existing data, and professional judgment. A potential dam failure of Tiogue Lake Dam would be expected to cause probable loss of human life as a result of the extensive development at the

177- Tiogue Lake Dam	
	downstream dam embankment. Considerable economic losses may also be experienced in the heavily developed commercial/residential area immediately downstream of the dam.

Source: RIDEM 2002b, RIDEM 2019a, RIDEM 2024, NID 2024

185- Black Rock Reservoir Dam	
Hazard Classification	High
Owner	In Foreclosure
Year Built	1885
Dam Type	Masonry, Earth, Gravity
Length x Height	280 ft x 11 ft
Drainage Area	1 square mile
Last Inspection	2023
Inspection Frequency	2 years
Last Condition Assessment	05/04/2018- Fair
EAP Prepared?	No
Downstream Description	Black Rock Reservoir Dam is located on the Black Rock Brook within a wooded area. A residential subdivision is located just east of Hill Street and approximately 0.4 miles downstream of Black Rock Reservoir Dam.
Downstream Dams	Pearce Pond Dam, rated a High hazard dam by RIDEM, is located about 0.8 miles downstream of Black Rock Reservoir Dam. It is anticipated that Pearce Pond Dam will be overtopped as a result of the hypothetical failure of Black Rock Reservoir Dam.
Downstream Bridges	The downstream channel flows beneath Hill Street about 0.4 miles downstream of Black Rock Reservoir Dam. A dam failure at Black Rock Reservoir Dam would likely result in shallow flooding at Hill Street.
Reservoir Area	The dam and dike are located along the northeastern side of the impoundment. The dam is located in an area where it is exposed to the full fetch of the reservoir surface. However, the dike is located in a cove at the north side of the impoundment and is sheltered by a peninsula of upland that limits the size of the waves that may impact the dike. The impoundment in the immediate vicinity of the dike generally appears to be shallow, as evidenced by vegetative cover in the pond in available aerial imagery. Several residential properties are located along the northern, western, and southern shores of the impoundment. The eastern shore is densely wooded. The slopes along the northern and southern shorelines are gradual with more moderate to steep slopes present along the western shoreline.

185- Black Rock Reservoir Dam	
Downstream Development	The banks of the stream channel are primarily wooded. Beyond Hill Street, Black Rock Brook flows through a residential subdivision and abuts the yards of several private residences. In particular, a residence on Hill Street appears to be only approximately 3 feet above the channel bank.
General findings of the 2019 inspection	The Black Rock Reservoir Dam and Dike were both completely overgrown with numerous live and dead trees ranging in size from saplings to 42-inches in diameter, brush, vines, briers, and weeds, and was covered with leaf litter. While a thorough inspection of the dam was completed, not all areas of the dam and dike were accessible for inspection due to the dense vegetative cover. Therefore, deficiencies beyond those noted in this section may be present but could not be identified due to the density of the vegetation at the time of the inspection. In general, the dam was found to have irregular, unprotected, and eroded upstream slopes; erosion along the crest, bulging and failed sections of the downstream wall, seepage/leakage at the base of the downstream walls, deteriorated concrete components of the spillway, and unknown operability of the low level outlet. The dike is in a state of more advanced deterioration with generally denser vegetative growth than the dam; a variable crest elevation with areas of erosion; and seepage and leakage discharging from tree root systems on the downstream side of the dam embankment.
Potential Effects of a Dam Break	Results of the analysis indicate a peak flood depth near the toe of the dam of about 6 feet. The peak depth ranges from about 4 feet upstream of Hill Street to about 6 feet downstream of Hill Street. The failure of the dam may potentially result in Hill Street becoming washed out. Flooding of the residences of the subdivision downstream of Hill Street is possible and may result in loss of life, in GZA's opinion. In addition, the failure of Black Rock Reservoir Dam would likely result in the subsequent domino failure of Pearce Pond Dam, a High hazard structure.
Recommended Hazard Potential Classification	GZA recommends that Black Rock Reservoir Dam be classified as High Hazard based on the aforementioned analyses, site/ downstream valley reconnaissance, site-specific GIS mapping and other existing data, and professional judgment. A potential dam failure of Black Rock Reservoir Dam will result in result in probable loss of human life, and significant economic losses, failure of a downstream dam and disruption of local roadways. Numerous residences near the Hill Street crossing may experience flooding. The flood wave, anticipated to be much larger than the 100-yr flood, may also overtop and fail Pearce Pond Dam, a high hazard structure.

Source: RIDEM 2006a, RIDEM 2019b, RIDEM 2024, NID 2024

371- Pearce Pond Dam	
Hazard Classification	High
Owner	Georges Bockstael
Year Built	1903

371- Pearce Pond Dam	
Dam Type	Earth, Masonry
Length x Height	100 ft x 10 ft
Drainage Area	Less than 1 square mile
Last Inspection	2020
Inspection Frequency	2 years
Last Condition Assessment	10/03/2017- Poor
EAP Prepared?	No
Downstream Description	Pearce Pond Dam is located on Black Rock Brook in the Town of Coventry. The immediate downstream area is wooded with considerable industrial and some residential development.
Downstream Area	The area downstream of the dam consists of residential homes, commercial businesses, and town streets, including Howard Avenue, Mumford Street, Lincoln Avenue, Ames Street and Main Street.
Downstream Dams	Phenix Mill Pond Dam (156) is a 19-ft high dam located about 0.5 miles downstream of Pearce Pond Darn on the North Branch of the Pawtuxet River. The dam is not expected to be affected by a dam failure at Pearce Pond.
Downstream Bridges	A culvert beneath Howard Avenue is located about 400 ft downstream of the dam. The culvert appeared to be about 5 feet high by 10 feet wide. Downstream of Howard Avenue, the brook is conveyed beneath a semi-active industrial complex.
Reservoir Area	According to existing plans on file at RIDEM, the bottom of the pond near the primary spillway is approximately 7 feet deep. The perimeter of the impoundment is generally overgrown and lined with dense brush and other vegetation along the northern and western sides and bordered by Howard Avenue and one residential structure on the eastern side. The size of the impoundment is generally small and limits the potential for the development of significant wave action upon the embankment.
Downstream Development	The banks of the Black Rock Brook are vegetated with considerable industrial and residential development above the brook. Several residences are located on the right overbank, about 10 ft to 15 ft above the channel. The Howard Avenue Industrial complex located at Howard Avenue sits atop the channel for a distance of over 200 ft. The occupied brick structure at the dam's downstream face is a small active woodworking shop.
General findings of the 2016 inspection	The Pearce Pond Dam was found to have a deteriorated and inoperable low level outlet, brush weed, woody vegetation, and sapling growth along the entire embankment left of the spillway; a cracked upstream wall left of the spillway; an overgrown section of the right embankment that continues to obstruct the right side of the spillway approach; a spillway with leakage and void at the left abutment contact and open masonry joints; and other dam safety deficiencies.
Potential Effects of a Dam	Results of the analysis indicate a peak flood depth near the toe of the dam of about 4 feet. The peak depth 0.6 miles downstream

371- Pearce Pond Dam	
Break	of the dam, downstream of the confluence of Black Rock Brook and the North Branch of the Pawtuxet River, is about 2.2 ft. The dam breach may result in the destruction of the occupied mill building at the downstream face of the dam. Flooding is also expected at the Howard Avenue industrial complex as a result of the limited capacity of the culvert beneath the complex. Howard Avenue may also be overtopped and potentially washed out as a result of the dam failure.
Recommended Hazard Potential Classification	GZA recommends that Pearce Pond Dam be classified as High Hazard based on the aforementioned analyses, site / downstream valley reconnaissance, site-specific GIS mapping and other existing data, and professional judgment. A potential dam failure of Pearce Pond Dam would likely result in the loss of human life at one or both industrial developments along Howard A venue. Howard A venue may also be overtopped or washed out, and shallow flooding is possible at the residential development at Howard A venue and near Mumford Street.

Source: RIDEM 2004, RIDEM 2016, RIDEM 2021a, NID 2024

561- Arnold Pond Dam	
Hazard Classification	High
Owner	The Greene Company
Year Built	1940
Dam Type	Gravity, Earth
Length x Height	400 ft x 26 ft
Drainage Area	4 square miles
Last Inspection	2023
Inspection Frequency	2 years
Last Condition Assessment	05/04/2018- Fair
EAP Prepared?	Yes
Downstream Description	Arnold Pond Dam is located on Roaring Brook, which flows through the Town of Coventry. The confluence with the Moosup River is located approximately 2.6-miles downstream of Arnold Pond Dam.
Downstream Area	The area downstream of the dam consists of a steep wooded valley. Areas within 50 feet of the dam are cleared of trees and covered with maintained grass. Areas downstream of the right portion of the embankment consist of areas of open grass fields. Roughly 600 feet downstream of the dam, it appears that flow from the primary spillway and auxiliary converge before entering a small mill pond approximately 900 feet downstream of the dam.

561- Arnold Pond Dam	
Downstream Dams	There are two small masonry mill dams downstream of Arnold Pond Dam on Roaring Brook. A small Lower Dam, breached several years ago, no longer impounds water. An abandoned wooden mill building is located on its right abutment. An additional small masonry dam is located near Hopkins Hollow Road. The dam has a small impoundment and a residential / garage structure on its left abutment.
Downstream Bridges	Hopkins Hollow Road is located approximately 0.25-miles downstream of Arnold Pond Dam. Nicholas Farm Road is located approximately 2-miles downstream of Arnold Pond Dam and may be impacted by a potential dam failure at Arnold Pond.
Reservoir Area	The dam is located within a rectangular portion of an otherwise narrow roughly 0.8-mile long impoundment. The rectangular portion of the pond is approximately 0.25 miles long, providing a relatively large area of open water over which waves may develop. The perimeter of the impoundment is generally undeveloped and wooded with moderate to flat slopes. Areas of apparently low topography were noted to the left of the dam embankment, between the dam and the auxiliary spillway; and for several hundred feet right of the right abutment. These areas may be subject to overtopping in the event of high-water conditions.
Downstream Development	The land use of the floodplain of Roaring Brook is primarily wooded or low-density residential. The entirety of development from the dam to Hopkins Hollow Road is property of the dam owner. Downstream of Hopkins Hollow Road, there are extensive wetlands and undeveloped woods.
General findings of the 2022 inspection	In general, Arnold Pond Dam was found to be in a maintained condition with a caretaker that had good knowledge of the history of the dam and existing maintenance items to be performed. There was an area of potential seepage along the toe of the wall left of the primary spillway. Areas of cracking were present along the auxiliary spillway chute; however, cracks were generally well maintained and repairs to the cracks are part of the normal maintenance of the dam. At this time, deficiencies at the dam should be considered ongoing maintenance level issues.
Potential Effects of a Dam Break	Results of the analysis indicate a peak flood depth at the immediate toe of the dam of about 13 feet and a peak flow of approximately 23,000 cfs. The flood wave is expected to dissipate as it moves downstream; thus, the peak flood flow approximately 2.6-miles downstream of the dam is predicted to decrease to about 8,400 cfs (at the Moosup River).
Recommended Hazard Potential Classification	GZA recommends that Arnold Pond Dam be classified as High Hazard based on the aforementioned analyses, site/downstream valley reconnaissance, site-specific GIS mapping and other existing data, and professional judgment. A potential dam failure of Arnold Pond Dam would result in probable loss of human life, due to the high peak breach outflow and given the structure adjacent to the small mill darn near Hopkins Hollow Road appears to be occupied. The dam break flood wave can also be expected to cause significant economic losses and disruption of local roadways via overtopping and potentially washing out Hopkins Hollow Road and Nicholas Farm Road.

Source: RIDEM 2002c, RIDEM 2022a, RIDEM 2024, NID 2024

152- Mill Pond Dam	
Hazard Classification	Significant
Owner	Unknown- in foreclosure
Year Built	1800
Dam Type	Gravity, Earth
Length x Height	285 ft x 19 ft
Drainage Area	68 square miles
Last Inspection	2022
Inspection Frequency	5 years
Last Condition Assessment	05/04/2018
EAP Prepared?	No
Downstream Description	Mill (Anthony) Pond Dam is located on the South Branch of the Pawtuxet River, which flows through the Town of Coventry. The immediate downstream area consists of industrial development occupying mill buildings on the left and tight overbanks. Laurel Avenue is located immediately downstream of the dam.
Downstream Dams	Quidnick Pond Upper Dam (151) is located about 2,000 ft downstream of Mill (Anthony) Pond Dam. Quidnick Pond Upper Dam is a 21 ft high, 130 ft long earthen embankment and masonry dam which is adjacent to a large industrial complex (Clariant, Inc.) on the downstream river's left overbank.
Downstream Bridges	Laurel A venue is located about 100 ft downstream of the dam. Flow is conveyed beneath the bridge via a 30-ft wide by about 15-foot high rectangular concrete channel. In addition to these structures, there are several additional structures on or over the South Branch of the Pawtuxet River that are not expected to be affected by a dam failure at Mill (Anthony) Pond Dam, in GZA's opinion.
Downstream Development	The land use of the floodplain of the South Branch of the Pawtuxet River between Mill and Quidnick Pond Upper Dam is predominantly industrial. Large industrial complexes are present on the left and right overbanks of the river, immediately downstream of the dam. The development is protected by stone masonry and concrete training walls which run along the river's left and tight banks.
General findings of the 2022 inspection	Embankment: Unsafe Low Level Outlet: Unsafe Primary Spillway: Fair Gated Outlets: Poor/Inoperable
Potential Effects of a Dam	Results of the analysis indicate a peak flood depth at the immediate toe of the dam of about 8 feet. As the flood wave progresses

152- Mill Pond Dam	
Break	downstream, it is expected to attenuate. Thus, peak flood flows are predicted to decrease from 9,050 cfs to about 7,000 cfs at Quidnick Upper Pond Dam. Since the magnitude of the incoming dam break flood wave from Mill (Anthony) Pond Dam exceeds the spillway capacity of Quidnick Upper Pond Dam, the domino failure of the dam is likely. The extent of flooding due to the hypothetical dam break may also include potential shallow flooding on the overbanks at the mill buildings and associated parking lot, downstream of Mill (Anthony) Pond Dam. The subsequent failure of Quidnick Upper and Lower Pond Dams is expected to result in significant economic losses at the large industrial complex associated with the dam (i.e., the Clariant Corporation). The Quidnick Reservoirs are used for industrial water supply and fire protection flows.
Recommended Hazard Potential Classification	OZA recommends that Mill (Anthony) Pond Dam be classified as Significant Hazard based on the aforementioned analyses, site/ downstream valley reconnaissance, site-specific GIS mapping and other existing data, and professional judgment. A potential dam failure of Mill (Anthony) Pond Dam would likely result in the domino failure of Quidnick Upper Dam, which is also classified as Significant Hazard by OZA. The failure of Mill (Anthony) Pond Dam is therefore expected to cause major economic losses to the Clariant Corporation industrial development on the left overbank of the South Branch of the Pawtuxet River, as a result of the domino failure of Quidnick Upper Pond Dam.

Source: RIDEM 2002d, RIDEM 2022b, RIDEM 2024, NID 2024

175- Quidnick Reservoir Dam	
Hazard Classification	Significant
Owner	YMCA of Pawtucket, Inc.
Year Built	1875
Dam Type	Masonry, Earth, Gravity
Length x Height	700 ft x 14 ft
Drainage Area	3 square miles
Last Inspection	2021
Inspection Frequency	5 years
Last Condition Assessment	05/04/2018
EAP Prepared?	No
Downstream Description	Quidnick Reservoir Dam is located on Quidnick Brook, which flows through the Town of Coventry. Coventry Reservoir is located approximately 2-rrti les downstream of Quidnick Reservoir Dam. Although Route 118 (Harkney Hill Road) lies within 150 ft of

175- Quidnick Reservoir Dam	
	the dam, in general the floodplain between Quidnick Reservoir and Coventry Reservoir is primarily undeveloped woods and wetlands.
Downstream Area	The area between the embankment and Harkney Hill Road, located approximately 100-feet downstream of the dam, and beyond Harkney Hill road is densely wooded. Little to no access was possible at the time of the inspection.
Downstream Dams	Coventry Reservoir Dam (176) is located about 3.1-miles downstream of Quidnick Reservoir Dam.
Downstream Bridges	Harkney Hill Road (Route 118) is located approximately 200-ft downstream of Quidnick Reservoir Dam. There are two separate box culverts that convey flow downstream of the roadway, a 3 ft high by 3 ft wide culvert for the spillway discharge channel and a 5 ft high by 5.5 ft wide concrete culvert for the low level outlet channel.
Reservoir Area	The dam is located along the north side of the 1,500 foot wide by 3,000 foot long reservoir. Aside from an island located approximately 250 feet upstream of the dam, the embankment is exposed to the full fetch of the impoundment. The perimeter of the impoundment is generally densely wooded with numerous residential structures along the eastern, western, and southeastern shorelines. The slopes around the reservoir are flat to moderate.
Downstream Development	The land use of the floodplain of Quidnick Brook is primarily undeveloped woods. Residences downstream of the dam, along Harkney Hill Road, appear to be well above (about 8 to 10 ft) the river banks.
General findings of the 2021 inspection	In general, Quidnick Reservoir Dam was found to have a clogged toe drain resulting in seepage breakout from the downstream bench, areas of soil loss adjacent to stone masonry walls, debris within the primary spillway approach, and other maintenance level deficiencies.
Potential Effects of a Dam Break	Results of the analysis indicate a peak flood depth at the immediate toe of the dam of about 7 feet and a peak flow of approximately 6,440 cfs. The peak flood flow is expected to attenuate as it travels downstream; thus, the peak depth approximately 0.7 miles downstream of the dam is estimated at about 3.7 ft and the peak flow at the headwaters of Coventry Reservoir is estimated at about 5,100 cfs.
Recommended Hazard Potential Classification	GZA recommends that Quidnick Reservoir Dam be classified as Significant Hazard based on the aforementioned analyses, site/ downstream valley reconnaissance, site-specific GIS mapping and other existing data, and professional judgment. A potential dam failure of Quidnick Reservoir Dam would result in no probable loss of human life, but would likely overtop and potentially washout Route 118.

Source: RIDEM 2002e, RIDEM 2021b, RIDEM 2024, NID 2024

186- Upper Pond Dam	
Hazard Classification	Significant
Owner	Town of Coventry

186- Upper Pond Dam	
Year Built	1900
Dam Type	Gravity, Earth
Length x Height	300 ft x 6 ft
Drainage Area	Less than 1 square mile
Last Inspection	11/17/2011
Inspection Frequency	5 years
Last Condition Assessment	05/04/2018- Poor
EAP Prepared?	No
Downstream Description	Upper Pond Dam is located on Northrup Brook within a generally wooded area. The banks of the brook between Upper Pond Dam and Route 117 are wooded. There is one residence approximately 75 feet downstream of Middle Pond Dam that is above Northrup Brook on the left overbank. Northrup Brook is culverted under the driveway to this residence via a 27-inch diameter CMP. Additional residential properties are located on the side streets off of Washington Street but are outside of the potential impact area.
Downstream Area	The area downstream of the dam is densely vegetated with small diameter trees and shrubs. The area is predominantly saturated, typical of swampy areas.
Downstream Dams	Middle Pond Dam, also a Significant Hazard Dam, is located approximately 0.35 miles downstream of Upper Pond Dam. Searles Capwell Pond Dam, rated as a Low hazard dam by RIDEM, is located approximately 0.6 miles downstream of Upper Pond Dam. Searles Capwell Pond Dam appeared to have been breached at the time of GZA's field reconnaissance visit. Mill Pond Dam, rated as a Significant hazard dam by RIDEM, is located approximately 0.9 miles downstream of Upper Pond Dam. Middle Pond Dam will likely be overtopped as a result of the hypothetical failure of Upper Pond Dam. It is not anticipated that Mill Pond Dam would be adversely affected by the failure of Upper Pond Dam.
Downstream Bridges	The downstream channel flows beneath Route 117 (Washington Street) and a Shell gasoline station via twin culverts. Due to the storage volumes of the Upper and Middle Pond Dams it is anticipated that Route 117 will be overtopped and will experience shallow flooding.
Reservoir Area	The dam is located along the southern side of the impoundment and is generally exposed to the entire fetch of the pond surface. The perimeter of the impoundment is generally developed with residential properties and landscaped lawn areas. No streams feed the impoundment; inflow is primarily attributed to surface runoff and springs.
Downstream Development	The banks of the stream channel are primarily wooded. The private residence on the left overbank of Northrup Brook (just downstream of Middle Pond Dam) is likely outside of the impact area. The residences located on the side streets off of

186- Upper Pond Dam	
	Washington Street also are likely to be outside of the potential impact area.
General findings of the 2011 inspection	In general, Upper Dam was found to have active seepage through the base of the downstream wall with apparent sediment transport, highly irregular and eroded upstream slopes, significant variability in the elevation of the top of the dam, numerous significant trees on and within 10-feet of the embankment and walls, and no low level outlet.
Potential Effects of a Dam Break	Results of the analysis indicate a peak flood depth near the toe of the dam of about 2.5 feet. The peak depth is attenuated to less than a foot within Middle Pond. The peak depth increases to about 5 feet just downstream of Middle Pond Dam but decreases to about 2 feet at Mill Pond Dam. The failure of the dam would likely result in the subsequent failure of Middle Pond Dam, due to its very minimal free board and the overtopping of Route 117. The driveway to the house adjacent to Middle Pond Dam would likely be washed out as a result of the flood wave. Route 117 may also become washed out as a result of the overtopping. The failure would also cause shallow flooding of the business/ commercial properties at Route 117 (just upstream of Mill Pond Dam).
Recommended Hazard Potential Classification	GZA recommends that Upper Pond Dam be classified as Significant Hazard based on the aforementioned analyses, site I downstream valley reconnaissance, site-specific GIS mapping and other existing data, and professional judgment. A potential dam failure of Upper Pond Dam would likely result in no probable loss of human life, but may result in significant economic losses, disruption of local roadways and restrict vehicular access to a residence. Middle Pond Dam is likely to be overtopped (and thus fail) and a driveway to a residence and Route 117 are likely to be overtopped and washed out. Shallow flooding is of the business/ commercial properties located on Route 117 is also possible.

Source: RIDEM 2006b, RIDEM 2011, RIDEM 2024, NID 2024

187- Middle Pond Dam	
Hazard Classification	Significant
Owner	Michael E. & Roberta Soucy
Year Built	1960
Dam Type	Earth
Length x Height	135 ft x 10 ft
Drainage Area	Less than 1 square mile
Last Inspection	05/19/2014
Inspection Frequency	5 years
Last Condition Assessment	05/04/2018- Poor

187- Middle Pond Dam	
EAP Prepared?	No
Downstream Description	Middle Pond Dam is located on Northrup Brook within a generally wooded area. There is one residence approximately 75 feet downstream of the dam that is above Northrup Brook on the left overbank. Northrup Brook is culverted under the driveway to this residence via a 27-inch diameter CMP. Additional residences are located on the side streets off Washington Street but are likely above the potential impact area.
Downstream Dams	Searles Capwell Pond Dam, rated as a Low hazard dam by RIDEM, is located approximately 0.25 miles downstream of Middle Pond Dam. Searles Capwell Pond Dam appeared to have been unintentionally breached at the time of GZA's field reconnaissance visit. Mill Pond Dam, rated as a Significant hazard dam by RIDEM, is located approximately 0.5 miles downstream of Middle Pond Dam. Neither dam is anticipated to be adversely affected by the failure of Middle Pond Dam.
Downstream Bridges	The downstream channel flows beneath Route 117 (Washington Street) and a Shell gas Station via twin culverts. Due to the significant storage volume within Middle Pond Dam, it is anticipated that Route 117 will be overtopped and will experience shallow flooding.
Downstream Development	The banks of the stream channel are primarily wooded. Northrup Brook is culverted under a private driveway almost immediately downstream of the toe of the dam. Private residences are located on the side streets off of Washington Street and appear to be outside of the potential impact area. A business/ commercial area, is located approximately 0.5 miles downstream and just upstream of Mill Pond Dam.
Potential Effects of a Dam Break	Results of the analysis indicate a peak flood depth near the toe of the dam of about 5 feet. The driveway to the house adjacent to Middle Pond Dam would likely be washed out as a results of the flood wave. The peak depth is attenuated to about 2 feet at Route 11 7. The failure of the dam would likely result in the overtopping of Route 117 and shallow flooding of the business/ commercial properties at Route 117 (just upstream of Mill Pond Dam). The roadway may be damaged.
Recommended Hazard Potential Classification	GZA recommends that Middle Pond Dam be classified as Significant Hazard based on the aforementioned analyses, site / downstream valley reconnaissance, site-specific GIS mapping and other existing data, and professional judgment. A potential dam failure of Middle Pond Dam would likely result in no probable loss of human life, but may result in significant economic losses, disruption of local roadways and restrict vehicular access to a residence. The driveway to the residence adjacent to Middle Pond dam is likely to be washed out restricting vehicular access to the house. Route 117 is likely to be overtopped and seriously damaged and the business/ commercial properties along Route 117 are likely to experience shallow flooding.

Source: RIDEM 2006c, RIDEM 2024, NID 2024

498- Hopkins Farm Pond Dam	
Hazard Classification	Significant
Owner	Island Green Golf, LLC

498- Hopkins Farm Pond Dam	
Year Built	1964
Dam Type	Earth
Length x Height	370 ft x 8 ft
Drainage Area	Less than 1 square mile
Last Inspection	2012
Inspection Frequency	5 years
Last Condition Assessment	N/A
EAP Prepared?	No
Downstream Description	Hopkins Farm Pond Dam is located on the South Branch of the Pawtuxet River at the Washington Village golf course in the Town of Coventry. There are several private residences (off of Main Street) on the right overbank of the channel. There is a town park with a maintenance/ storage shed on the left overbank of the channel. The residence and the park are both within 0.15 miles of the dam.
Downstream Area	The area immediately downstream of the dam includes a fairway and green associated with the surrounding golf course. The maintained golf course extends to approximately 180 feet downstream of the dam. Following the golf course is the Washington Secondary Trail, a public use bike path. Roughly 800 feet downstream of the dam, after passing through a wooded area with public and private structures and parking areas on either side, is Main Street. Approximately 900 feet further downstream (roughly 1700 feet downstream of the dam), after passing through a wooded area, the downstream channel enters the Pawtuxet River South Branch.
Downstream Dams	Washington Pond Upper Dam, rated a Low hazard darn by RIDEM, is located about 0.7 miles downstream of Hopkins Farm Pond Dam. Washington Pond Upper Dam is not anticipated to be adversely affected by the failure of Hopkins Farm Pond Dam.
Downstream Bridges	The downstream channel flows beneath a bike path approximately 200 feet downstream of the darn and beneath Route 117 (Main Street) about 0.15 miles downstream of the dam via twin 18-inch diameter cast iron pipe. The hypothetical failure of Hopkins Farm Pond Dam would likely result in the overtopping and washing out of Main Street.
Reservoir Area	The dam is located within the southern portion of the roughly 400 foot long by 250 foot wide impoundment. The perimeter of the impoundment is generally maintained grounds associated with the surrounding golf course with a grove of trees on the upstream left hillside. Flows enter into the impoundment from the north via an unnamed tributary to the Pawtuxet River South Branch. The impounded is divided into two basins by a cart path causeway and culvert.
Downstream Development	The banks of the stream channel are primarily wooded. The area immediately downstream of the dam is occupied by a bike path. Beyond the bike path there is a ballfield on the left overbank of the channel along with a Town maintenance/ storage shed.

498- Hopkins Farm Pond Dam	
	There is a house on the right overbank of the channel (just upstream of Main Street) that is about 4 to 6 feet above the normal water surface elevation in the brook. Beyond Main Street, the channel flows through a wooded uninhabited swamp.
General findings of the 2012 inspection	In general, Hopkins Farm Pond Dam was found to have significant erosion and scarping along the upstream slope, irregularities and undulations along the crest of the embankment, deterioration of the principal spillway outlet pipe, development within the emergency spillway potentially impacting discharge capacity, several large trees and shrubs on the embankment, scouring of the concrete forming the principal spillway drop inlet, an inoperable low level outlet, and other dam safety deficiencies.
Potential Effects of a Dam Break	Results of the analysis indicate a peak flood depth near the toe of the dam of about 6 feet. The failure of the dam would result in damage to the golf course and the damage of the bike path just beyond of the toe of the dam. The peak depth is attenuated to about 4 feet at Route 117. The failure of the dam would likely result in the overtopping of Route 117. The roadway may be washed out. Flooding of the residences above the channel on Route 117 is unlikely, in GZA's opinion.
Recommended Hazard Potential Classification	GZA recommends that Hopkins Farm Pond Dam be classified as Significant Hazard based on the aforementioned analyses, site / downstream valley reconnaissance, site-specific GIS mapping and other existing data, and professional judgment. A potential dam failure of Hopkins Farm Pond Dam would likely result in no probable loss of human life, but may result in significant economic losses and disruption of local roadways. The failure of the dam would result in damage to the golf course and the destruction of the bike path. In addition, Route 117 is likely to be overtopped resulting in shallow flooding across the road.

Source: RIDEM 2006d, RIDEM 2012a, RIDEM 2024, NID 2024

645- Center of New England #1	
Hazard Classification	Significant
Owner	Commerce Park Realty, LLC
Year Built	Unknown
Dam Type	Earth
Length x Height	200 ft x 8 ft
Drainage Area	3 acres
Last Inspection	07/13/2012
Inspection Frequency	5 years
Last Condition Assessment	N/A
EAP Prepared?	No

645- Center of New England #1	
Downstream Description	The Center of New England #1 Dam is located within a residential/commercial area of Coventry near the intersection of Arnold Road and Larch Drive. Tiogue Lake is located about a quarter mile downstream of the Center of New England #1 Dam within a densely populated area.
Downstream Area	The area downstream of the dam includes a gravel parking area and two warehouse buildings. As the impoundment was empty during the inspection, no indications of seepage were present.
Downstream Dams	Tiogue Lake Dam (177) is a 15-foot high and 1,400-foot long earthen embankment dam located approximately 1.25 miles downstream of the Center of New England #1 Dam.
Downstream Bridges	There is no bridge between the Center of New England #1 Dam and Tiogue Lake.
Reservoir Area	The dam is located within the northern portion of the rounded impoundment. The impoundment area is roughly 300 feet long by roughly 150 feet wide. The perimeter of the impoundment is wooded with steep slopes and piles of apparent excavation spoils along the western shoreline. Flows enter into the impoundment near its south side via a stone lined trapezoidal channel from an apparent storm water detention basin located to the south of the dam.
Downstream Development	The downstream area of the Center of the New England # 1 Dam is densely populated mostly by residential houses. There is a commercial building located approximately 130 ft from the dam that appears to be on a relatively higher elevation than the dam break flood plain. About 10 houses on Arnold Road between the intersections with Larch Drive and Harrington Road are likely to be impacted by the hypothetical dam failure. As of 2024, there is currently a large amount of pending development around this dam.
General findings of the 2012 inspection	In general, Center of New England #1 Dam was found to have steep and irregular slopes, areas of erosion and shallow slope failures on the upstream slope, dense vegetation preventing access to many areas of the dam, and discontinuities and apparent instability of the spillway pipes.
Potential Effects of a Dam Break	The Center of New England #1 Dam failure flood wave would flow overland through the commercial and residential property immediately downstream of the dam toward Tiogue Lake. Within this flood path, the dam break flood wave would likely spread widely over the flood plain causing shallow flooding of several houses located on Arnold Road, Balsam Drive and Harrington Road. Results of the analysis indicate a peak flood depth near the toe of the dam of about 3 feet, attenuating to about 2 feet in the vicinity of Arnold Road, and to approximately 1 foot near Harrington Road. Loss of life is not expected due to the hypothetical dam failure of the Center of New England #1 Dam due to its very small storage capacity. However, significant damage is anticipated to the houses impacted by the flood wave, in GZA's opinion.

Source: RIDEM 2007, RIDEM 2012b, RIDEM 2024, NID 2024

The 2019-2023 Annual Reports to the Governor on the Activities of the Dam Safety Program (RIDEM 2020b, 2021a, 2022, 2023 2024) provides information on dam safety activities of dams in Coventry from 2019-2023.

Year: 2019 (RIDEM 2020b)	
Unsafe dams with known owners and overview of unsafe conditions	371- Pearce Pond (High)- Vegetation prohibited complete inspection & inoperable low level outlet 498- Hopkins Farm (Significant)- Raised spillway crest, auxiliary spillway partially filled 645- Centre of New England #1 (Significant)- Vegetation prohibited inspection, spillway movement & debris impacting flow
Unsafe dams with unknown owners	152- Mill Pond (Significant) 176- Coventry (High)- as of 2024, dam ownership has been identified 177- Tiogue Lake (High)- as of 2024, dam ownership has been identified 185- Black Rock Reservoir (High)
Dam No. 371- Pearce Pond (High)	The dam was inspected in July 2016. DEM sent a Registration/Hazard Classification letter to the owner in August 2016 which was subject to an appeal. In April 2018, the owner withdrew his appeal. DEM issued a NOV to the owner in January 2019 for the unsafe conditions.
Dam No. 498- Hopkins Farm (Significant)	The dam was inspected in 2012, and DEM issued a NOV to the owner in 2013 for the unsafe conditions. No change in status occurred in 2019.
Dam No. 645- Centre of New England #1 (Significant)	The dam was inspected in 2012, and DEM issued a NOV to the owner in 2015 for the unsafe conditions. In 2015, DEM approved a repair plan. No change in status occurred in 2019.
Inspections completed	177- Tiogue Lake (High) 185- Black Rock Reservoir (High)
Requested inspections	DEM investigates complaints for any high or significant hazard dam upon request by any person who has cause to believe the dam is unsafe. In 2019, DEM received 5 complaints for dams, one of which was in Coventry. • 185- Black Rock Reservoir (High) o Reason for inspection: seepage o Conclusion: Dike not considered part of dam for dam safety purposes (failure of dike not expected to cause probable loss of life or significant property damage
Year: 2020 (RIDEM 2021a)	
Unsafe dams with known owners and overview of	176- Coventry Reservoir (High)- Inoperable low level outlet 371- Pearce Pond (High)- Vegetation prohibited complete inspection & inoperable low level outlet

unsafe conditions	498- Hopkins Farm (Significant)- Raised spillway crest, auxiliary spillway partially filled 645- Centre of New England #1 (Significant)- Vegetation prohibited inspection, spillway movement & debris impacting flow
Unsafe dams with unknown owners	152- Mill Pond (Significant) 177- Tiogue Lake (High) 185- Black Rock Reservoir (High)
Dam No. 176- Coventry Reservoir (High)	The dam was inspected in March 2020, and DEM issued a Notice of Violation (NOV) to the Town of Coventry in October 2020 for unsafe conditions. The Town filed an appeal of the NOV with DEM's Administrative Adjudication Division and is working to resolve the unsafe conditions.
Dam No. 371- Pearce Pond (High)	The dam was inspected in July 2016. DEM sent a Registration/Hazard Classification letter to the owner in August 2016, which was appealed to DEM's Administrative Adjudication Division (AAD). In April 2018, the owner withdrew his appeal. DEM issued a Notice of Violation (NOV) to the owner in January 2019 for unsafe conditions. The owner did not file an appeal of the NOV with AAD and has not complied with the NOV. No change in status occurred in 2020.
Dam No. 498- Hopkins Farm (Significant)	The dam was inspected in 2012, and DEM issued a Notice of Violation (NOV) to the owner in 2013 for unsafe conditions. The owner did not file an appeal of the NOV with DEM's Administrative Adjudication Division and has not complied with the NOV. No change in status occurred in 2020.
Dam No. 645- Centre of New England #1 (Significant)	The dam was inspected in 2012, and the Department of Environmental Management (DEM) issued a Notice of Violation (NOV) to the owner in 2015 for unsafe conditions. The owner did not file an appeal of the NOV with DEM's Administrative Adjudication Division. In 2015, DEM approved a repair plan. No change in status occurred in 2020.
Inspections completed	167- Flat River Reservoir (High) 176- Coventry Reservoir (High) 371- Pearce Pond (High) 561- Arnold Pond (High)
Year: 2021 (RIDEM 2022c)	
Unsafe dams with known owners and overview of unsafe conditions	176- Coventry Reservoir (High)- Inoperable low level outlet 371- Pearce Pond (High)- Vegetation prohibited complete inspection & inoperable low level outlet 498- Hopkins Farm (Significant)- Raised spillway crest, auxiliary spillway partially filled 645- Centre of New England #1 (Significant)- Vegetation prohibited inspection, spillway movement & debris impacting flow
Unsafe dams with unknown owners	152- Mill Pond (Significant) 177- Tiogue Lake (High) 185- Black Rock Reservoir (High)

Dam No. 176- Coventry Reservoir (High)	The dam was inspected in March 2020, and DEM issued a Notice of Violation (NOV) to the Town of Coventry in October 2020 for unsafe conditions. The Town filed an appeal of the NOV with DEM's Administrative Adjudication Division. In 2021, the Town continued to work to resolve the unsafe conditions.
Dam No. 371- Pearce Pond (High)	The dam was inspected in July 2016. DEM sent a Registration/Hazard Classification letter to the owner in August 2016, which was appealed to DEM's Administrative Adjudication Division (AAD). In April 2018, the owner withdrew his appeal. DEM issued a Notice of Violation (NOV) to the owner in January 2019 for unsafe conditions. The owner did not file an appeal of the NOV with AAD and has not complied with the NOV. No change in status occurred in 2021.
Dam No. 498- Hopkins Farm (Significant)	The dam was inspected in 2012, and DEM issued a Notice of Violation (NOV) to the owner in 2013 for unsafe conditions. The owner did not file an appeal of the NOV with DEM's Administrative Adjudication Division and has not complied with the NOV. No change in status occurred in 2021.
Dam No. 645- Centre of New England #1 (Significant)	The dam was inspected in 2012, and DEM issued a Notice of Violation (NOV) to the owner in 2015 for unsafe conditions. The owner did not file an appeal of the NOV with DEM's Administrative Adjudication Division. In 2015, DEM approved a repair plan. The owner has not repaired the dam. No change in status occurred in 2021.
Inspections completed	185- Black Rock Reservoir (High) 175- Quidnick Reservoir (Significant) 187- Middle Pond (Significant)
Year: 2022 (RIDEM 2023)	
Unsafe dams with known owners and overview of unsafe conditions	176- Coventry Reservoir (High)- Inoperable low level outlet 371- Pearce Pond (High)- Vegetation prohibited complete inspection & inoperable low level outlet 498- Hopkins Farm (Significant)- Raised spillway crest, auxiliary spillway partially filled 645- Centre of New England #1 (Significant)- Vegetation prohibited inspection, spillway movement & debris impacting flow
Unsafe dams with unknown owners	152- Mill Pond (Significant) 177- Tiogue Lake (High) 185- Black Rock Reservoir (High)
Dam No. 176- Coventry Reservoir (High)	The dam was inspected in March 2020, and DEM issued a Notice of Violation (NOV) to the Town of Coventry in October 2020 for unsafe conditions. The Town filed an appeal of the NOV with DEM's Administrative Adjudication Division. In 2022, the Town continued to work to resolve the unsafe conditions.
Dam No. 371- Pearce Pond (High)	The dam was inspected in July 2016. DEM sent a Registration/Hazard Classification letter to the owner in August 2016, which was appealed to DEM's Administrative Adjudication Division (AAD). In April 2018, the owner withdrew his appeal. DEM issued a Notice of Violation (NOV) to the owner in January 2019 for unsafe conditions. The owner did not file an appeal of the NOV with AAD and has not complied with the NOV. No change in status occurred in 2022.

Dam No. 498- Hopkins Farm (Significant)	The dam was inspected in 2012, and DEM issued a Notice of Violation (NOV) to the owner in 2013 for unsafe conditions. The owner did not file an appeal of the NOV with DEM's Administrative Adjudication Division and has not complied with the NOV. No change in status occurred in 2022.
Dam No. 645- Centre of New England #1 (Significant)	The dam was inspected in 2012, and DEM issued a Notice of Violation (NOV) to the owner in 2015 for unsafe conditions. The owner did not file an appeal of the NOV with DEM's Administrative Adjudication Division. In 2015, DEM approved a repair plan. The owner has not repaired the dam. No change in status occurred in 2022.
Inspections completed	561- Arnold Pond (High) 152- Mill Pond (Significant)
Repair approvals	177- Tiogue Lake (High)- Embankment repair
Year: 2023 (RIDEM 2024)	
Unsafe dams with known owners and overview of unsafe conditions	176- Coventry Reservoir (High)- Inoperable low level outlet 371- Pearce Pond (High)- Vegetation prohibited complete inspection & inoperable low level outlet 498- Hopkins Farm (Significant)- Raised spillway crest, auxiliary spillway partially filled 645- Centre of New England #1 (Significant)- Vegetation prohibited inspection, spillway movement & debris impacting flow
Unsafe dams with unknown owners	152- Mill Pond (Significant) 177- Tiogue Lake (High) 185- Black Rock Reservoir (High)
Dam No. 176- Coventry Reservoir (High)	The dam was inspected in March 2020, and the Department of Environmental Management (DEM) issued a Notice of Violation (NOV) to the Town of Coventry in October 2020 for unsafe conditions. The Town filed an appeal of the NOV with DEM's Administrative Adjudication Division. In 2023, the Town continued to work to resolve the unsafe conditions.
Dam No. 371- Pearce Pond (High)	The dam was inspected in July 2016. DEM sent a Registration/Hazard Classification letter to the owner in August 2016, which was appealed to DEM's Administrative Adjudication Division (AAD). In April 2018, the owner withdrew his appeal. DEM issued a Notice of Violation (NOV) to the owner in January 2019 for unsafe conditions. The owner did not file an appeal of the NOV with AAD and did not comply with the NOV. In November 2023, DEM filed a complaint in Superior Court. The owner appears to be working towards addressing the NOV.
Dam No. 498- Hopkins Farm (Significant)	The dam was inspected in 2012, and DEM issued a Notice of Violation (NOV) to the owner in 2013 for unsafe conditions. The owner did not file an appeal of the NOV with DEM's Administrative Adjudication Division and has not complied with the NOV. No change in status occurred in 2023.
Dam No. 645- Centre of New England #1	The dam was inspected in 2012, and DEM issued a Notice of Violation (NOV) to the owner in 2015 for unsafe conditions. The owner did not file an appeal of the NOV with DEM's Administrative Adjudication Division. In 2015, DEM approved a repair plan.

(Significant)	The owner has not repaired the dam. No change in status occurred in 2023.
Inspections completed	167- Flat River Reservoir (High) 177- Tiogue Lake (High) 185- Black Rock Reservoir (High) 561- Arnold Pond (High) 186- Upper Pond (Significant)

3.3.2.3 Extent

Flood events call into question the structural integrity of dams that would affect Coventry. In addition to the threat of flooding downstream during a dam breach, the Town is also concerned about the dam gate systems. It is suspected that most of the antiquated dam gates may not open properly to let off water, thereby flooding the areas behind the dam.

Most of Rhode Island's dam failure inundation mapping is publicly available through RIDEM/RIGIS. Of the available mapping, the dam failure inundation of dams in Coventry is shown below (Figure 7).

Based on available reports and inundation mapping, a dam failure of the Flat River Reservoir would cause the most impact to critical facilities in Coventry, including inundation of the Coventry Fire Department and Town Offices. The inundation area of this dam is shown in light green in Eastern Coventry (Figure 7).

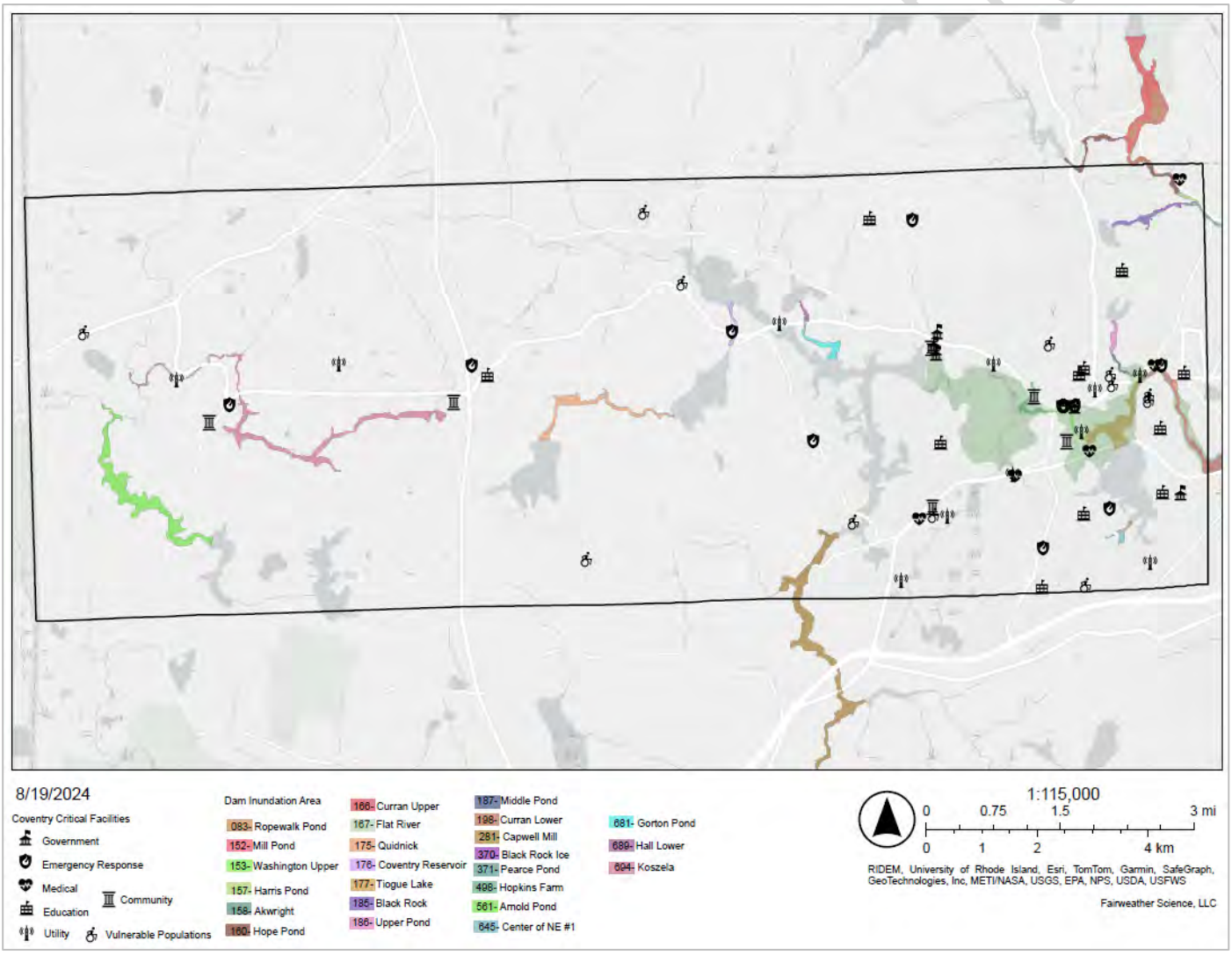
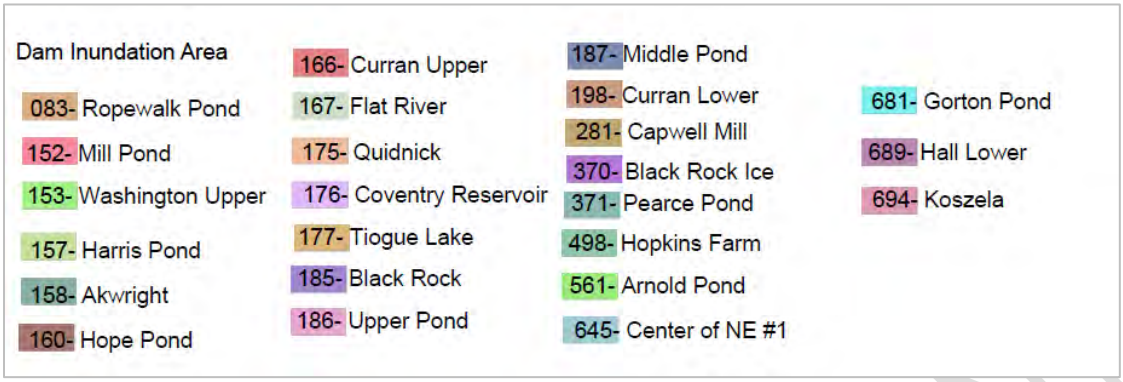


Figure 7- Dam Failure Inundation Mapping



Dams that are not located in Coventry but have an inundation area that would inundate portions of the Town include: Capwell Mill Pond (Significant hazard potential, West Greenwich), Hope Pond Dam (Significant hazard potential, Scituate), Curran Upper Reservoir Dam (High hazard potential, Cranston), Curran Lower Reservoir Dam (High hazard potential, Cranston. However, none of these inundation areas will impact critical facilities.

Based on the lack of past dam failures and the criteria identified in Table 7, the extent of dam failure in Coventry has been Negligible as there has never been a major failure; however, if a High or Significant Hazard Dam in Coventry were to fail, the extent of dam failure could be **Significant** with multiple deaths and severe injuries; medium shutdown of some critical infrastructure and facilities; 20% to 50% of residential and 10-25% of commercial structures are severely damaged; and large impacts to local operations for long amounts of time.

3.3.2.4 History

There has never been a failure of a high hazard or significant hazard dam in Coventry. According to Coventry DPW staff, in the late 1980s, the wooden dam at Rope Walk Pond (low hazard dam) failed. There was no major damage or injury.

3.3.2.5 Impact

Severe winter storms, flooding, and a hurricane could all bring enough rain and or snowfall to cause a dam failure. The age of dams also poses a risk to the structural integrity of dams. A failure of the antiquated gates could cause considerable loss of life, property, and economy.

3.3.2.6 Probability of Future Occurrence

According to the 2024 State of Rhode Island HMP:

RIDEM's Dam Safety Program conducts routine monitoring and inspection of dams within the state on the previously identified schedule, with priority placed on those dams which pose the greatest potential threat. However, to fully determine the probability of a future event, a full engineering inspection would need to be completed on each dam, something beyond the scope of this plan.

Dams undergoing repair and/or reconstruction are required to be designed to pass at least the 1%-annual-chance rainfall event with one foot of freeboard. The most critical and hazardous dams are required to meet a spillway design standard much higher than passing the runoff from a 1%-annual-chance rainfall event. Although not all the dams have been shown to withstand the 1%-annual-chance rainfall event, most of the dams meet this standard due to original design requirements or recent spillway upgrades.

The potential for dam failure reduces when the dam is properly taken care of and receives a "Satisfactory"

condition rating.

Based on the most recent condition assessments and the criteria identified in Table 8, it is **Possible** that Coventry will experience a dam failure event in the calendar year; there is a between 1-49.9% annual probability of occurring.

3.3.2.7 Future Conditions Including Climate Change

Nature of the hazard	Climate change is unlikely to influence the nature of future dam failures in Coventry.
Location	Climate change is unlikely to influence the location of future dam failures in Coventry. However, changing factors that influence the potential of a dam failure (heavy rains, flooding) may result in a dam failure of a dam that has not previously failed.
Extent	A potential outcome of changing climate in Rhode Island is an increase in extreme precipitation events which are likely lead to more severe floods and a greater risk of dam failure. Additional projected greater periods of drought conditions and high heat may result in ground cracking, a reduction of soil strength, erosion, and subsidence in earthen dams (RIEMA 2024). See Table 15 for projections of future precipitation amounts in Coventry under different climate change models.
Impact	As the condition of most High and Significant hazard dams in Coventry are either Poor or Fair, increased precipitation is likely to lead to more frequent dam failures unless dam deficiencies are addressed. The impact of these dam failures may include damage to homes and critical facilities in the inundation area, potential loss of life, overtopping of roads which may lead to erosion and traffic disruptions, and funding required to rehabilitate failed dams.
Probability of Future Events	The NOAA NCEI State Climate Summary 2022 for Rhode Island suggests that the number of extreme precipitation events are projected to increase for Rhode Island. These extreme events will likely place increased stress on dams within the State (RIEMA 2024). The 2024 State of Rhode Island HMP states: *The 2018 National Climate Assessment report indicates that much of the water infrastructure in the northeast portion of the United States, including dams, is nearing the end of its planned life expectancy. As indicated in the report:* • *"Aging and deteriorating dams and levees also represent an increasing hazard when exposed to extreme or, in some cases, even moderate rainfall. Several recent heavy rainfall events have led to dam, levee, or critical infrastructure failures, including the Oroville emergency spillway in California in 2017, Missouri River levees in 2017, 50 dams in South Carolina in October 2015 and 25 more dams in the state in October 2016, and New Orleans levees in 2005 and 2015. The national exposure to this risk has not yet been fully assessed."* At present, there is no comprehensive assessment of the climate-related vulnerability and risks to existing dams. Additionally, there are no common design standards concerning the repair or modification of existing dams nor for the designed and construction of new dams operated in the face of changing climate risk (RIEMA 2024).
Changes in population patterns	Future dam failures are possible to cause changes in population patterns in Coventry as residents may relocate out of inundation areas.
Changes in land use	Future dam failures are possible to cause changes in land use development in Coventry as

development	inundated areas may become unsuitable for future development to reduce future losses.

3.3.3 Flooding

This section focuses on flooding in terms of riverine, urban, and flash flooding. Further discussion on storm surge is **not included** in this plan, due to Coventry's inland location in central western Rhode Island.

3.3.3.1 Description

Flooding is the overflow or accumulation of water on normally dry land, often caused by heavy rainfall, snowmelt, storm surges, or the failure of natural or artificial barriers. Flooding can lead to the inundation of homes, roads, farmland, and other areas, causing damage to property, disruption of daily life, and potential threats to human safety and the environment (RIEMA 2024).

Riverine Flooding: Riverine flooding refers to the overflow of water from a river or a stream onto adjacent land areas. This type of flooding occurs when the water level in a river or stream rises significantly and exceeds its banks, inundating the surrounding areas. The severity of riverine flooding can be influenced by the amount and intensity of rainfall in the watershed, the size, shape, and slope of the river or stream channel, and the presence of dams on the river system.

Urban Flooding: FEMA defines urban flooding as 'the inundation of property in a built environment, particularly in more densely populated areas, caused by rain falling on increased amounts of impervious surfaces and overwhelming the capacity of drainage systems." In Rhode Island, urban flooding has consistently increased due to a number of factors, including the filling for development of natural wetlands and waterways, the reduction of permeable surfaces, and the aging and insufficient capacity of stormwater systems.

Flash Flooding: Flash flooding occurs during heavy or extended periods of rain, generally when the ground is unable to rapidly absorb the water. Most flash flooding in Rhode Island is caused by hurricanes or extra-tropical storms, Nor'easters, or stationary thunderstorms. Heavy sustained rain can create rapid flooding very quickly, and flooding can occur miles away from where the rain fell. Factors that can contribute to the severity of flash flooding include rainfall intensity, duration, drainage condition, and ground conditions (paved or unpaved). Flash floods are particularly dangerous to people and property, as six inches of moving water can knock a person down and two feet can lift a vehicle. As there is often little warning of a flash flood event, they are the cause of most flood fatalities.

3.3.3.2 Location

The Town's proximity to the Pawtuxet River and its tributaries makes it vulnerable to flooding and the effects of severe storms. The Pawcatuck and Pawtuxet Basins largely comprise the watersheds which surround Coventry and West Greenwich. The Pawtuxet Basin directly impacts the residents of Coventry. The Pawtuxet River is 11 miles in length and drains a watershed of approximately 231 square miles in area. Overall, the watershed contains 64 ponds (named & unnamed), 93 brooks, 7 tributary rivers and 18 dams. Most notably, it consists of the North Branch Pawtuxet River and the South Branch Pawtuxet River. The North Branch is located in the northern Harris section of the Town. It flows easterly from near the Cranston/Scituate border in the vicinity of the Arkwright Bridge into the Phenix section of West Warwick; the South Branch is located in central Coventry and flows in an easterly direction from Western Coventry parallel to Flat River Road to West Warwick in the vicinity of Pulaski Street. The confluence of the branches is at Riverpoint in West Warwick.

During the March 2010 flood events, specific areas which were affected included:

- Parker Street & Harding Street were inundated with flood waters from the Pawtuxet River; some residents were subject to mandatory evacuation with flood waters reaching 5' in the homes.
- Osprey Drive, Kingfisher Drive & Eagle Drive were impassable and homes experienced flooding from the reservoir.
- Club House Road was impassable by flood waters from Flat River Reservoir.
- Isle of Capri Drive homeowners experienced flooded basements and waters to the first floor level.
- Phillips Hill Road at its intersection with Route 117 was flooded and impassable.

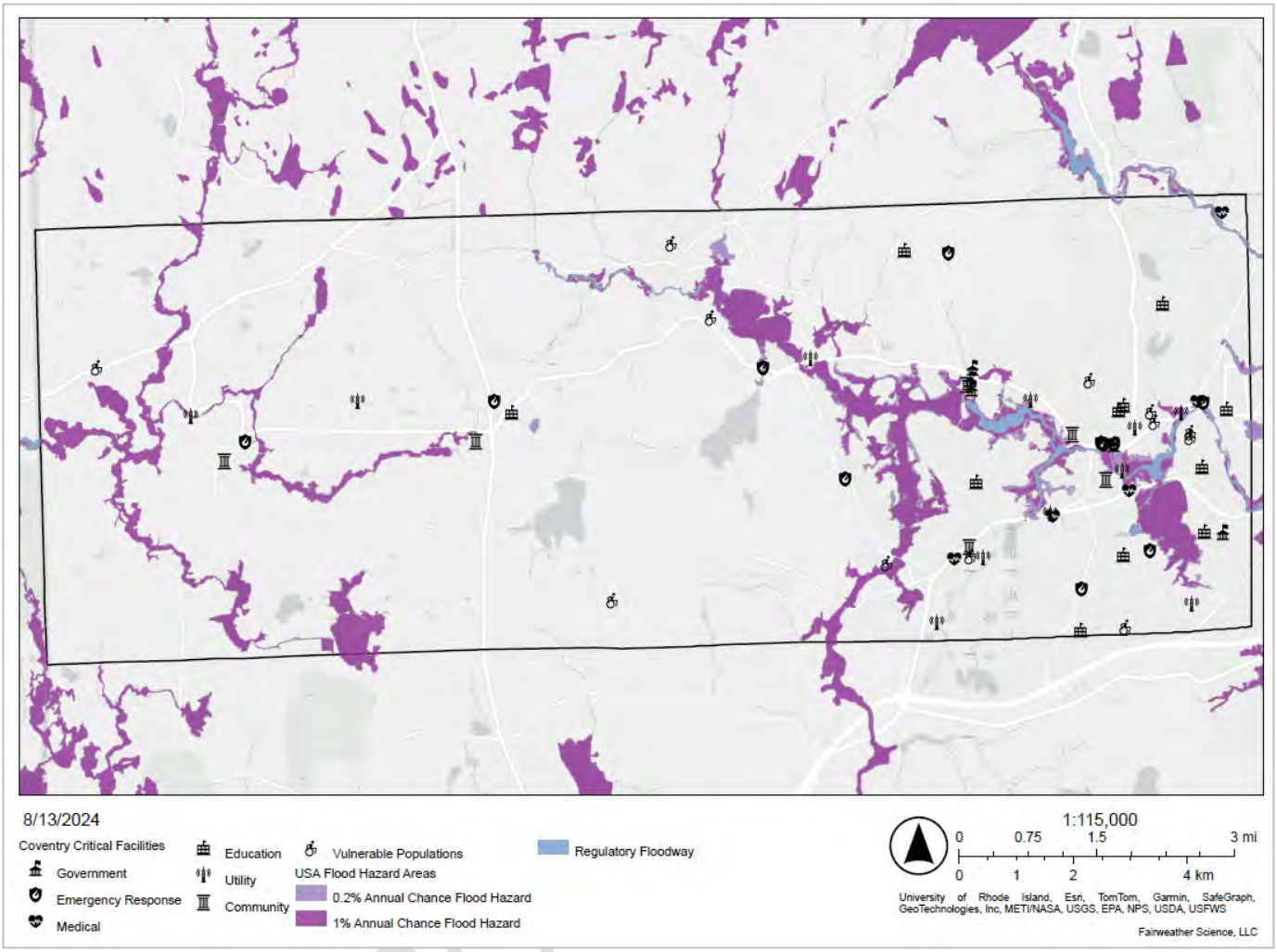
Figure 8- Historic Coventry mill building downstream of damaged bridge and dam- April 2010.

- Station Street and Route 117 area was impassable due to flooding.
- Jefferson Drive at its intersection with Tiogue Avenue was flooded and impassable.
- Laurel Avenue bridge abutment was undermined and rendered unsafe for passage.
- Maple Valley Road was washed out at two areas.
- Franklin Road, Hammett Road and Fish Hill Road were flooded and washed out.
- Nelson Capwell Road was flooded and washed out during the rain events.

The 2024 Draft Comprehensive Plan states that there are several intersections that experience flash flooding in rain events, including:

- State-owned:
  - Washington St. at Laurel Ave.
  - Main St. at Trestle Bridge
  - Flat River Road at House 1668
  - Knotty Oak Road (Route 116)
  - Tiogue Ave. between Hopkins Hill Rd and Jefferson Dr.
- Town-owned:
  - Johnson's Blvd at West Lake Dr.
  - LaForge Dr at Gervais St.
  - Maple Valley Rd.
  - Industrial Dr.
  - Taft St., Greene St., and The Pembroke Neighborhood (neighborhoods surrounding the Nathanael Greene Homestead)

Known flood hazard areas are shown in Figure 9 and more detailed information in the current FEMA Flood Insurance Rate Maps (FIRMs). These can be found in Appendix XX.



Source: FEMA FIRMs Mapping Data (2024)

Figure 9- Special Flood Hazard Areas in Coventry

<u>Areas that Provide Natural Floodplain Functions</u>

The residents of Coventry strongly support the preservation of the rural quality of Central and Western Coventry, believe that the natural beauty of the town is an asset, and wish to protect the environment. To that end the town has designated 77 protected conservation or environmental management areas; operates 49 recreational and open space facilities; and works with organizations such as The Nature Conservancy and The Audubon Society of Rhode Island to protect local ecosystems.

These protected areas provide Ecosystem Services to the residents of Coventry. Ecosystem Services can be defined as the benefits humans receive from nature, specifically a healthy functioning ecosystem (EPA 2024).

Floodplains as an ecosystem provision functions or services important to not only human communities, but also to natural communities including plants, animals, and fish.

FEMA defines floodplains as “Any land area susceptible to being inundated by flood waters from any source. A Flood Insurance Rate Map identifies most, but not necessarily all, of a community’s floodplain as the Special Flood Hazard Area.”

Natural Floodplain Functions include but are not limited to (FEMA, 2017):

- Water Resources
  - Natural Flood and Erosion Control
    - Provide flood storage and conveyance
    - Reduce flood velocities
    - Reduce peak flows
    - Reduce sedimentation
  - Water Quality Maintenance
    - Filter nutrients and impurities from runoff
    - Process organic wastes
    - Moderate temperature fluctuations
  - Groundwater Recharge
    - Promote infiltration and aquifer recharge
    - Reduce frequency and duration of low surface flows
- Biological Resources
  - Biological Productivity
    - Rich alluvial soils promote vegetative growth
    - Maintain biodiversity
    - Maintain integrity of ecosystems
  - Fish and Wildlife Habitats
    - Provide breeding and feeding grounds
    - Create and enhance waterfowl habitat
    - Protect habitats for rare and endangered species

In reference to Coventry's **surface waters**, the 2024 Draft Comprehensive Plan states:

"Although Coventry is not one of Rhode Island's "coastal towns," its vast network of more than twenty lakes, reservoirs, and ponds, totaling about 1,850 acres of surface water, contributes significantly to its character and supports recreational opportunities, scenic vistas, and quality of life. These bodies of water also provide wildlife habitat and form a part of a larger regional ecological system. At the macro level, we can look at development and its impact on the watershed. A watershed is the land area that drains into rivers, streams, lakes or estuaries. Most of Eastern Coventry is located in the Pawtuxet River Watershed (66.0 %), while the western portion of Coventry is mostly within the watershed of the Quinebaug River (32.5 %). Small portions of Coventry are also within the Wood-Pawcatuck Rivers Watershed (1.4 %) and Hunt River Watershed (0.1 %).

Coventry's water bodies are an invaluable, irreplaceable resource demanding restorative and quality control action by the Town on behalf of residents and visitors. Land use restrictions and protection of buffers zones, combined with ongoing monitoring for water quality, are necessary to begin to restore and preserve these amenities. In particular, strict enforcement of regulations for stormwater management, erosion and sedimentation control, septic system design, and non-point source discharges are essential to protecting and improving water quality."

In reference to **wetlands**, the 2024 Draft Comprehensive Plan states:

"Coventry's wetlands are vital to the community's ecological system. They retain stormwater runoff (which reduces flooding), retain excess nutrients, provide habitat for wildlife, and help groundwater resources recharge. Wetlands comprise about 15% percent of Coventry and occur throughout the town

complementing drainage patterns, rivers, streams and surface water bodies. Their individual character ranges from narrow and linear in nature to broad irregular shaped parcels of up to several hundred acres. Several of the larger water bodies and wetlands are located in proximity to the town's southern boundary at Mishnock Swamp, Great Grass Pond and Whitford Pond.

Because of the sensitive nature and importance of wetlands to the overall ecosystem, strong state and federal regulations have been put in place for their protection. The Rhode Island Freshwater Wetlands Act (Rhode Island General Laws Sections 2-1-18 et. seq.) and the Rhode Island Department of Environmental Management's (RI DEM) Rules and Regulations Governing the Administration and Enforcement of the Freshwater Wetlands Act are the primary regulations dealing with the enforcement of wetlands protection, alteration and permitting in Rhode Island. Wetlands are not considered buildable without special permitting and oversight by the RI DEM."

In reference to **aquifers, groundwater, and groundwater recharge**, the 2024 Draft Comprehensive Plan States:

"Groundwater resources, or aquifers, provide one of the primary sources of drinking water for Coventry residents (and are significant source for water statewide). While a significant portion of the eastern part of Coventry receives its water from the Kent County Water Authority (KCWA), the KCWA draws some of its water from groundwater in Coventry. The remaining Coventry residents and businesses receive potable water from private or community wells.

An aquifer is an underground layer of saturated rock, rock fractures, or unconsolidated materials (gravel, sand, or silt) that allows water to move through it, supplying wells and springs. Each aquifer has a different water capacity and is influenced by climate. For example, in years where Coventry experiences wet weather, the aquifers will "recharge" their supply while during droughts there is insufficient precipitation to recharge the aquifer. To avoid withdrawing more water from the aquifer than can be recharged, groundwater supplies must be carefully examined as a major factor in how future development within the Town is managed. Additionally, climate changes in the coming decades may increase periods of drought, so aquifers may not be able to recharge enough to meet consumption.

Groundwater resources are also altered by over-development and contamination, representing a threat to public health and sensitive environments. Over a decade ago, the Rhode Island Water Resources Board mapped 21 aquifers that have the potential to supply future and existing public water systems. The Mishnock Groundwater Reservoir and its surrounding recharge area, as well as the aquifer tributary to the Spring Lake Wellhead, located in east-central Coventry, are extremely vulnerable to contamination from a wide variety of pollution sources."

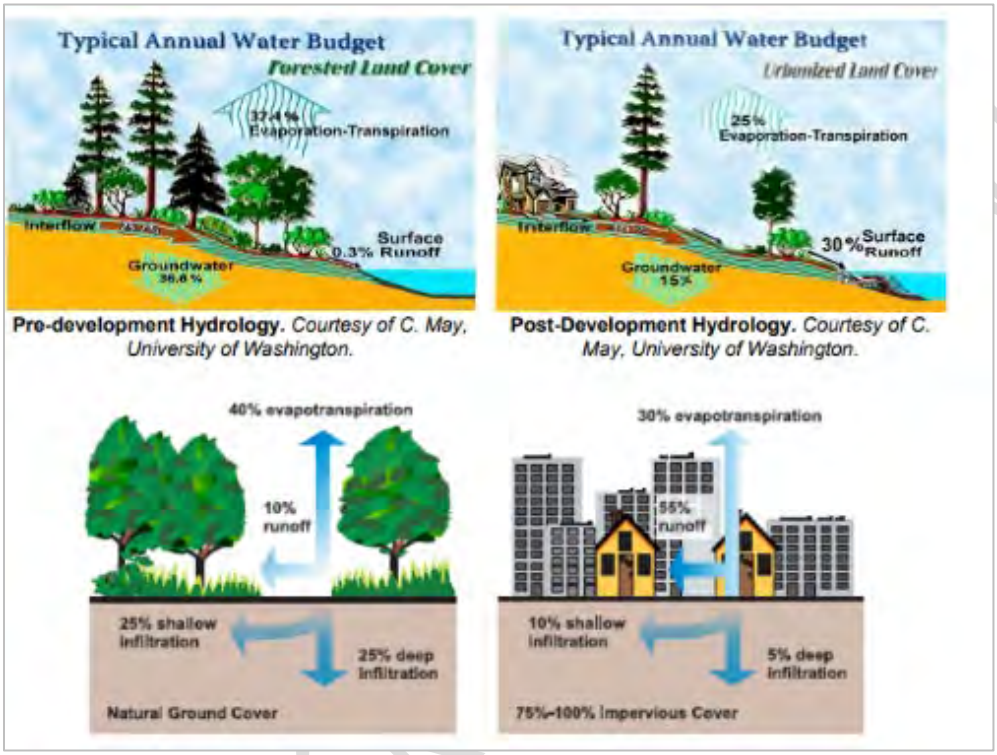
These three water resources (surface water, wetlands, and aquifers) and the special flood zones identified in Figure 9 make up the floodplain of Coventry. The services provisioned by the floodplain are vulnerable to natural hazard impacts, particularly due to climate change, pollution from flooding, drought, and extreme temperatures. Additionally, these functions can be threatened by human development and construction.

Beyond the floodplain itself, Coventry is building up and preserving areas that provision ecosystem services similar to Natural floodplain functions. While many of these forested, natural, and open areas are not within the defined areas of the floodplain, they are within the watersheds of Coventry and perform some of the same functional services as part of the larger, local ecosystem.

The Town has developed 11 stormwater best-management practices (BMPs). These built stormwater infrastructure facilities are nature-based solutions (NBS) that mimic natural ecosystem services such as infiltration, retention and detention, filtration, and sediment reduction, and more. These BMPs are often

designed to include native plants and create habitat for native pollinators, animals, and birds.

Working with the State, private owners, and non-profit organizations, the Town has conserved 77 natural areas. These undeveloped areas maintain their natural functions and prevent significant runoff from reaching the floodplain. Highly pervious soils and native vegetation reduce surface runoff, which can prevent flooding and pollution through floodwaters.



Pre-development Hydrology. *Courtesy of C. May, University of Washington.*

Post-Development Hydrology. *Courtesy of C. May, University of Washington.*

Source: EPA 2015

Figure 10- Pre-Development and Post-Development Hydrology

While not within the floodplain, these BMPs and preserved natural function open spaces provide flood peak flow reduction, sediment reduction, nutrient filtration, temperature moderation, infiltration and aquifer recharge, and biodiversity and ecosystem maintenance.

3.3.3.3 Extent

Localized flooding can be expected to occur on an annual basis. The flood event which occurred in March 2010 was approximately a 250 year event.

A floodplain is a flat or gently sloping area adjacent to a river, stream, or other water body. These areas act as a buffer during periods of heavy rainfall or snowmelt, absorbing excess water and preventing it from rushing downstream too quickly. In its common usage, a floodplain refers to areas inundated by the 100-year flood, the flood that has a 1% chance of being equaled or exceeded in any given year, and the 500-year flood, the flood that has a 0.2% chance of being equaled or exceeded in any given year. The 100-year flood is the national minimum standard to which communities regulate their floodplains through the NFIP (RIEMA 2024).

The Town of Coventry participates in the National Flood Insurance Program (NFIP). As of August 2024, there are 12 policies in an AE zone, and 86 policies in the X zone. More information for the NFIP can be found in Section XX.

FEMA maintains regulatory flood maps called Flood Insurance Rate Maps (FIRM). Insurance companies refer to these when providing coverage to homeowners. These maps are available for viewing at the FEMA Map Service Center https://msc.fema.gov. Please note that there is a process for the public to request a change in the flood zone designation for their property.

The FIRMs maps for Coventry were updated on 9/7/2023 (Western Coventry), 7/19/2023 (Western Coventry), and 10/2/2015 (Eastern Coventry). The full FIRMs are available in Appendix XX.

RIEMA states that Coventry has the following planning significance related to flooding:

Jurisdiction	Coastal Flood NRI	Coastal Flood EAL	Riverine Flood NRI	Riverine Flood EAL
Coventry	No Rating	No Rating	Relatively Low	Relatively Moderate

Source: RIEMA 2024 NRI: National Risk Index EAL: Expected Annual Loss

Based on the extent of past events and the criteria identified in Table 7, the extent of flooding in Coventry is considered **Limited**, with potential for some injuries; short shutdown of some critical infrastructure and facilities; fewer than 10% of residential and commercial structures damaged; and a small number of local operations impacted for short amounts of time.

3.3.3.4 History

While they might not be categorized as a flash flood or riverine flood, Coventry experiences annual overflow on roads after heavy rains. Clogged culverts have led to overtopping of roads and damage to the culverts.

Table 13 provides details on historical floods that have impacted Coventry. Since the 2018 HMP, there have been 0 flooding events that impacted Coventry.

Table 13- Historical Flooding Events in Coventry (1996-March 2024)

Date	Event Type	Event Details
2/13/2008	Flood	A low pressure system developed off the Mid-Atlantic coast and moved up the east coast southeast of Nantucket producing snow, rain, and ice across Southern New England. Widespread two to four inch rainfall amounts resulted in small stream and poor drainage flooding as well as some minor river flooding. In addition, there was some minor wind damage from strong northeast winds, especially along the coast. In Coventry, Routes 116 and 117 were flooded with 18 inches of water on the roadways. In addition, Tiogue Avenue was impassable with several cars underwater.
3/14/2010	Flood	A stacked low pressure system (surface low and upper level low on top of each other) moved southeast of Nantucket, spreading rain across Southern New England. This resulted in widespread rainfall totals of three to six inches. In eastern Massachusetts, a strong southeasterly low level jet pumped ample moisture into the area, resulting in rainfall totals on the order of six to ten inches. This resulted in major flooding across eastern Massachusetts and Rhode Island, including small stream, urban, and poor drainage flooding. In addition, the Concord River at Lowell, the Shawsheen River at Wilmington, and the Pawtuxet River at Cranston reached record flood stages within two to four days of the rain. Strong winds associated with the low pressure system and the low level jet affected both the east and south coasts, resulting in numerous downed trees and wires and some minor structural damage to a few buildings. Multiple streets across West Warwick, Coventry, and Warwick were closed due to flooding, including Aster, Begonia, Canna, Daisy, and River Streets in West Warwick. These streets were flooded with up to four feet of water and resulted in residents in the area being evacuated. The Natick Bridge, which carries East Avenue traffic over the Pawtucket River was closed and has since been deemed by the Rhode Island Department of Transportation as unsafe and beyond repair.

Date	Event Type	Event Details
		Fifteen to twenty streets in Coventry were washed out or damaged.||Johnson Pond in Coventry rose out of its banks, flooding several homes and pushing docks inland. Elsewhere in Coventry, several roads were washed out by flooding brooks.
3/29/2010	Flood	A low pressure system sat just south of Long Island for two days, bringing heavy rain to much of Southern New England during that time. A persistent southerly low level jet brought very moist air into the area, which resulted in high rainfall rates. A coastal front along the I-95 corridor enhanced rainfall in that area. This event followed a heavy rainfall and record flooding event in mid-March as well as a second lesser rain event about a week prior. Rivers across much of Massachusetts and Rhode Island were still high from those events and warm temperatures in northern Vermont and New Hampshire resulted in a period of snowmelt, that resulted in rises on both the mainstem Connecticut and Merrimack Rivers. All of these factors led to a second record rainfall and flooding event. Two day rainfall totals across Southern New England ranged from an inch to ten inches. Though concentrated in Rhode Island and southeastern Massachusetts, all of Southern New England was affected by the flooding. In hardest hit Rhode Island, two day rainfall totals ranged from five to ten inches. Providence, Boston, and Blue Hill Observatory in Milton, MA set record monthly precipitation totals during the month of March. Providence also set the record for the wettest month ever in the period of record. Both the Pawtuxet River in Rhode Island and the Sudbury River in Massachusetts set floods of record. River and areal flooding resulted in millions of dollars of damage across Rhode Island, with numerous homes, businesses, and people affected. A portion of Interstate 95, the main highway through Rhode Island, was closed for two days after the Pawtuxet River inundated the highway with up to three feet of water. Amtrak service through the state was suspended for several days because portions of the tracks were under up to two feet of water in several locations across the state. Passengers were rerouted through Springfield, Massachusetts. Though all 39 cities and towns in Rhode Island were affected, the most damage was seen in Warwick, West Warwick, Coventry, and Cranston, where the Pawtuxet and Pocasset Rivers flow through. Four dams in Rhode Island were breached and many others were overtopped and close to breaching, which resulted in the inspection of 42 dams throughout the state. Officials estimated that more than 500 people were evacuated from their homes because of rising water or the threat of rising water. More than 500 Rhode Island National Guardsmen were activated during the flooding, filling sandbags, directing traffic, and aiding in evacuations. Six National Grid substations were flooded and four were close to flooded, disrupting electrical service in Westerly and Warwick. One of the amphibious vehicles generally used on the Boston Duck Tours was lent to the state of Rhode Island to transport utility workers to and from these substations and switching terminals. Shell fishing grounds in the southern part of the state were closed temporarily over concerns of sewage and other contaminants in the water. They reopened about a week and a half later. Half a dozen sewage treatment plants through the state were overwhelmed or compromised by the flooding, leading to raw sewage being discharged into area rivers and bays. The Governor's office estimated that tens of thousands of properties were impacted by the flooding and about 4,000 workers were affected when the businesses they worked in were closed during and after the flooding. Numerous schools and many businesses, as well as the state government were closed for at least a day because of the flooding. President Obama issued a federal disaster declaration for the entire state of Rhode Island and residents received an automatic extension for filing their state and federal income taxes. The disaster declaration encompassed both the mid-March storm and this storm. Eight to ten inches of rain fell across Kent County causing record rises on the Pawtuxet River at Cranston, cresting at nearly 21 feet, roughly 6 feet higher than the previous record set only two weeks prior. The Pawtuxet River flows into Kent County and resultant flooding occurred in Warwick, West Warwick, and Coventry. The South Branch of the Pawtuxet River also went into flood, setting a record at just over nine feet. Numerous basements were flooded in East Greenwich, Warwick, West Warwick, and Coventry. In addition, numerous streets were closed due to flooding in Coventry, East Greenwich, and West Warwick, including portions of Jefferson Boulevard, and Routes 2 and 5, all major secondary roads in Warwick. One of Coventry's fire stations was badly damaged by floodwaters that they hope to repair within six months. Evacuations were ordered in Coventry downstream of the Laurel Avenue Bridge over the

Date	Event Type	Event Details
		Pawtuxet River after the bridge was severely eroded and in danger of collapsing along with the adjacent dam. A 50 foot portion of the side of the Concordia building that sits along the river near the dam collapsed. This compounded the concerns about the Laurel Avenue Bridge and adjacent dam. The bridge held through the flooding, though was seriously compromised and has been closed since the end of March while a new bridge is built, or repairs can be made to the current bridge.

Source: NOAA Storm Events Database- Storm Prediction Center Product (NWS 2024a)

From 1950-2023, Kent County experienced 5 coastal flood events, 16 flash flood events, and 24 other flood events (RIEMA 2024). There were zero (0) injuries or deaths as a result from these flooding events (RIEMA 2024).

Additionally, Rhode Island has experienced three Presidential Disaster Declarations related to floodings (Table 14). Coventry was not severely impacted by any of these disasters. Since the 2018 HMP, there have been 3 Rhode Island Presidential Disaster Declarations relating to flooding. Coventry was impacted by the 2010 and 2024 events. Specific impacts can be found in Section 3.3.3.5.

Table 14- State of Rhode Island Presidentially Declared Disasters Relating to Flooding

Designation	Incident Period	Declaration Date	Incident Type
DR-39-RI	08/20/1955	08/20/1955	Hurricane and Flood
DR-1704-RI	04/15 – 04/16/2007	05/25/2007	Severe Storms and Inland/Coastal Flooding
DR-1894-RI	03/12 – 04/12/2010	03/29/2010	Severe Storms and Flooding
EM-3311-RI	03/12 – 04/12/2010	03/30/2010	Severe Storm, Flooding
DR-4753-RI	09/10 – 09/13/2023	01/07/2024	Severe Storm, Flooding, Tornado
DR-4765-RI	12/17 – 12/19/2023	03/20/2024	Severe Storm, Flooding
DR-4766-RI	01/09 – 01/13/2024	03/20/2024	Severe Storm, Flooding

Source: FEMA 2024

3.3.3.5 Impact

Heavy rains, quick thaws and precipitation, and hurricanes accompanied by heavy winds and rain make the Town vulnerable to personal, property and environmental damage occasioned by flooding.

Structures most vulnerable to flood impacts include dams, residential homes, mobile home parks, water supply substations, facilities storing hazardous materials, historic buildings, sewer pump stations and electric substations.

During the 2010 flood, the Warwick and West Warwick Wastewater Regional Treatment Facilities which abut the Pawtuxet River were rendered inoperable during peak flooding. Both treatment facilities are permitted for treatment of wastes at a tertiary level. For a period of time following the flooding events, the West Warwick Regional Treatment Facility was able to treat wastes first at a primary level then at a secondary level and eventually at a tertiary level. As a result of flooding of these plants, sewers were unable to handle discharges from residences and businesses causing, at times, backflows of wastes and effluent flows into the rivers and streams.

Specific areas that were impacted by the 2010 flooding include:

- Areas east of Lewis Farm Road
- Areas east of Station Street
- Centre of New England (residential and commercial development)

- Route 116
- Mobile homes in the town

In late 2023/early 2024, heavy rains led to evacuations of a property owned by the Coventry Housing Authority.

March 2024 flooding resulted in Coventry High School and Alan Shawn Feinstein Middle School being closed due to water damage. A FEMA recovery center was set up at the Coventry Town Hall Annex.

The following image shows flooding of a roadway in Coventry due to heavy rain in January 2024. This event caused the closure of at least 12 roads in Coventry (Patch 2024).

Source: Patch 2024. Photo Credit: Rachel Nunes/Patch

Figure 11- Flooding in Coventry Leading to Road Closures (January 2024)

3.3.3.6 Probability of Future Occurrence

Based on previous occurrences and the criteria identified in Table 8, it is **Likely** that Coventry will experience a flood event in the calendar year; there is a between 50-89.9% annual probability of occurring.

3.3.3.7 Future Conditions Including Climate Change

Nature of the hazard	Climate change is unlikely to influence the nature of future flooding events in Coventry.
Location	Climate change is possible to influence the location of future flood hazard areas in Coventry as smaller streams that were not historically flooded may become inundated with water due to increased precipitation in the future.
Extent	Table 16 shows Coventry's historical and future projections for days without precipitation and annual precipitation in inches by season under different climate change models.

Table 15- ClimRR Climate Projection Report- Precipitation

Precipitation	Hist.	Mid-Century RCP 4.5	Mid-Century RCP 8.5	End-Of-Century RCP 4.5	End-Of-Century RCP 8.5
ANNUAL					
Days Without Precipitation (Days)	18	16	17.33	15.67	14.67
Annual Precipitation (Inches)	43.87	47.37	48.62	49.52	50.71
AUTUMN					
Daily Precipitation (Inches)	0.11	-	0.09	-	0.1
Maximum Daily Precipitation (Inches)	2.24	-	1.79	-	2.12
WINTER					
Daily Precipitation (Inches)	0.15	-	0.15	-	0.16
Maximum Daily Precipitation (Inches)	1.93	-	2.07	-	2.32
SPRING					
Daily Precipitation (Inches)	0.1	-	0.13	-	0.13
Maximum Daily Precipitation (Inches)	1.75	-	2.07	-	1.94
SUMMER					
Daily Precipitation (Inches)	0.16	-	0.19	-	0.19
Maximum Daily Precipitation (Inches)	1.93	-	2.62	-	2.54

Source: Climate Risk and Resilience Portal (ClimRR) 2024

Mid-Century Precipitation Analysis: The historical annual total precipitation is 43.87 inches. Under RCP 8.5 the annual minimum precipitation at mid-century is 48.62 inches which represents a +4.75 inch change from the baseline.

Mid-Century Precipitation Analysis, Days Without Measurable Precipitation: The historical longest consecutive number of days without precipitation 18.00 days. Under RCP 8.5 the longest stretch of days without precipitation at mid-century is 17.33 days which represents a -0.67 day change from the baseline.

End-Century Precipitation Analysis: The historical annual total precipitation is 43.87 inches. Under RCP 8.5 the annual minimum precipitation at end-century is 50.71 inches which represents a +6.84 inch change from the baseline.

End-Century Precipitation Analysis, Days Without Measurable Precipitation: The historical longest consecutive number of days without precipitation 18.00 days. Under RCP 8.5 the longest stretch of days without precipitation at end-century is 14.67 days which represents a -3.33 day change from the baseline.

It is likely that climate change will influence the extent of flooding in the future.

Impact	As the probability of annual precipitation increases, so does the potential of flooding, which increases the potential impacts to the Town. These increased impacts are likely to

	include inundation and damage to homes and critical facilities, and road flooding and resultant erosion.
Probability of Future Events	As the annual precipitation in Coventry is likely to increase due to climate change (Table 15), the probability of flooding events also increases.
Changes in population patterns	It is possible that future flood events cause changes in population patterns in Coventry as future floods may impact more homes, residents, and critical facilities.
Changes in land use development	It is likely that future flood events cause changes in land use development in Coventry as areas around the existing floodplain may be undevelopable to prevent future losses from flooding.

According to the 2024 State of Rhode Island HMP:

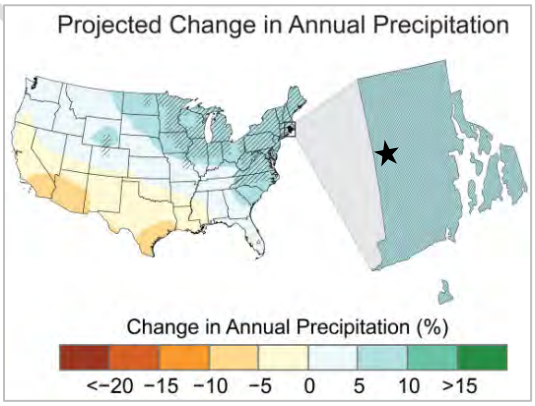
As per the State of Rhode Island Climate Change portal, the impacts of climate change upon Rhode Island's built and natural environments are wide-ranging, discernible, and documented, and, in many cases growing in severity. Related to flooding, Rhode Island will experience more extreme and intense precipitation events. Rhode Island's precipitation rates are climbing an inch almost every 10 years, and 2018 was the third wettest year on record. In 2018, Rhode Island saw a record number of days with over an inch of rain. Under a higher emissions pathway, it is expected that Rhode Island will see a continued increase in frequency and intensity of extreme precipitation events (RIEMA 2024).

The 2018 Resilient Rhody report states:

Climate change is expected to contribute to more intense and wetter precipitation events, now and into the future. Over the past 80 years, Rhode Island and southern New England have experienced a significant increase in both flood frequency and flood severity, including a doubling of the frequency of flooding and an increase in the magnitude of flood events. Intense rainfall events (heaviest 1% of all daily events from 1901 to 2012 in New England) have increased 71% since 1958. Rhode Island's average annual precipitation has increased more than 10 inches since 1930 (Resilient Rhody 2018).

While multiple climate change models suggest that greenhouse gas increases will result in increased precipitation in Rhode Island, observed increases in precipitation across the northeastern United States are greater than predicted models (Resilient Rhody 2018).

Figure 12 shows the nationwide projected change in annual precipitation. Rhode Island is in the +5-10% category.



Source: NCEI 2022

Figure 12- Rhode Island Projected Change in Annual Precipitation

3.3.4 Riverine Erosion

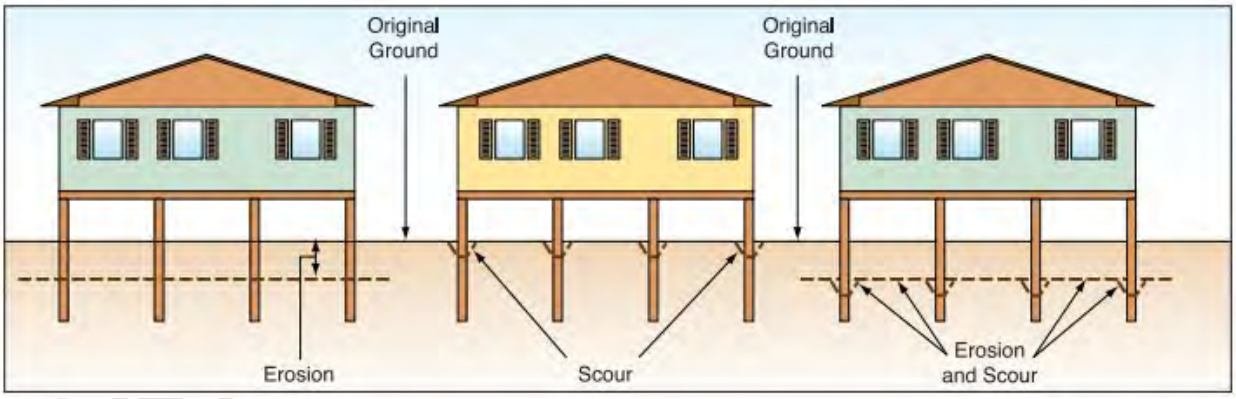
This hazard profile will focus on erosion in terms of riverine erosion as well as roadway erosion following heavy rain/flooding events. Coventry is not located near the coastline and is not threatened by coastal erosion.

3.3.4.1 Description

Riverine erosion is the wearing away of river and stream banks by flowing water. It occurs when the force of the water exceeds the resistance of the soil and vegetation along the bank. Riverine erosion is a natural process in almost any river or stream, but can be intensified by human influence or intense storms/floods. The variables that influence the stability (or erodibility) of stream banks in riverine erosion include:

- Critical height of the slope
- Inclination of the slope
- Cohesive strength of the soil in the slope
- Distance of the structure in question from the shoulder of the stream bank
- Degree of stabilization of the surface of the slope
- Level and variation of groundwater within the slope
- Level and variation in level of water on the toe of the slope
- Tractive shear stress of the soil
- Frequency of rise and fall of the surface of the stream

Riverine scour is the removal of sediment or engineered materials from the bed or banks of a watercourse and can occur when the forces imposed by the flow on a sediment particle exceed the stabilizing forces. Scour is the most intense at points where there is a focusing of flow at channel constrictions (e.g. bridges), where impacts occur (e.g. to bridge piers) or where the local geology exhibits changes in properties.



Source: FEMA 2009

Figure 13- Distinguishing Between Erosion and Scour

3.3.4.2 Location

In Coventry, erosion commonly occurs along creek/riverbanks following heavy rain and flood events. Heavy rain and flooding events lead to blocked culverts and overtopping of roads, which cause erosion of the roadways and bridge structures.

Specifically, in February 2024, the Cahoone Bridge was closed for an indefinite amount of time after the RIDOT determined erosion had caused "serious bridge deficiencies". Following the January 2024 disaster declaration for severe storms/flooding, DR-4753-RI, the Town identified the following locations that were

impacted by erosion:

- Chandler Drive (1 location)
- Beechwood Street (1 location)
- Barbs Hill Road
- Cahoone Road
- Cobblestone Terrace
- Gibson Lane (1 location)
- Ledge Road
- Lewis Farm Road (2 locations)
- Nicholas Farm Road (2 locations)
- Rice City Road
- Sisson Road (3 locations)
- Terrace Avenue
- Shippee Cove Road
- Franklin Road Culvert
- Read Avenue Culvert
- Maple Valley Road Culvert
- Susan Bowen Road (1 location)
- Nelson Capwell Culvert
- Hill Street
- Johnson's Boulevard @ West Lake Drive
- Old North Road
- Wisteria Drive
- Peckham Lane (1 location)

3.3.4.3 Extent

In Coventry, erosion has led to road and bridge closures and damage to culverts.

Based on the extent of past events and the criteria identified in Table 7, the extent of erosion in Coventry is considered **Limited**, with potential for some injuries; short shutdown of some critical infrastructure and facilities; fewer than 10% of residential and commercial structures damaged; and a small number of local operations impacted for short amounts of time.

3.3.4.4 History

In 2017, the Town of Coventry, U.S. Department of Agriculture Natural Resources Conservation Service (managing agency), Cardi Corp. (primary contractor), and Fuss & O'Neill Inc. (primary consultant) won an award from the American Public Works Association for the Project of the Year award in the Small Cities/Rural Communities–Disaster/Emergency category for their project, *The Pawtuxet River Stabilization Project*, which is aimed at mitigating future erosion and scour of the Anthony Mill Clock Tower. This award honors agencies that demonstrate creativity, ingenuity, and efficiency in delivering projects that profoundly impact communities with 75,000 or fewer people (Concrete Construction 2017).

Figure 14 shows a micropile and tieback system that protects the Anthony Mill Clock Tower from scour from the Pawtuxet River. Stone arch weirs and stream barbs in the river control elevation changes, reduce velocities within the river, and direct erosive velocities away from critical infrastructure and into the center of the river. These also improved habitat value because they were constructed using natural rock to provide shelter for fish and other aquatic organisms. Articulated concrete mats overlain by river stone filled with soil also guard against scour and provide habitat value. The lower articulated concrete matting layer serves as extra protection against extreme events along critical sections of the river. Prefabricated walls were used along the river to reduce overall project costs. Additionally, a control system was built to make segments of the river dry for construction and then flipped to the other side of the river to make that part of the river dry for construction (Concrete Construction 2017).

Source: Concrete Construction 2017

Figure 14- Coventry's Pawtuxet River Stabilization Project (2017)

On February 20, 2024, the Cahoone Road Bridge was closed after the RIDOT determined erosion had caused "serious bridge deficiencies". RIDOT stated that the bridge would remain off-limits until grant funding was secured for repairs, which was not anticipated until 2026 (Warwick Post 2024).

Source: Warwick Post 2024

Figure 15- Closure of Cahoone Road Bridge Due to Erosion

3.3.4.5 Impact

Impacts of riverine erosion can range in severity from minimal loss of riverbank to more extreme impacts including infrastructure damage or complete failure, reduced water quality and impacts to drinking water,

and impacts to aquatic life and habitat.

In Coventry, erosion has impacted several roads, bridges, and culverts. Erosion protection has been implemented to mitigate future erosion and scour of the Anthony Mill Clock Tower from the Pawtuxet River.

3.3.4.6 Probability of Future Events

In Coventry, erosion occurs following some severe flooding or high rain events. Not all flood events cause erosion in the Town. The Planning Team states that they have noticed that the rivers and streams are becoming more inundated with water during these events which has resulted in increased erosion that has not been historically recorded.

Based on previous occurrences and the criteria identified in Table 8, it is **Possible** that Coventry will experience an erosion event in the calendar year; there is a between 1-49.9% annual probability of occurring.

3.3.4.7 Future Conditions Including Climate Change

Nature of the hazard	Climate change is unlikely to influence the nature of future erosion events in Coventry.
Location	Climate change has already begun to alter the location of erosion events in Coventry as historically, the Town has not been severely threatened by erosion. Locations around river/stream banks, vulnerable roads, and culverts are likely to be threatened by future erosion events in Coventry.
Extent	Due to climate change, the extent (magnitude/severity) of future erosion events is projected to likely increase. As the extent of future severe storms and flooding events is projected to increase, the resultant extent and impacts from erosion will also increase.
Impact	As erosion events are projected to increase in extent due to climate change, impacts to the Town will also likely increase. Potential impacts are likely to include more frequent road/bridge closures, damage to critical facilities/infrastructure, and impacts to residential structures.
Probability of Future Events	As climate change is causing an increase in the probability and extent of severe storm events, heavy rain, and flooding, the probability of future erosion events are likely to increase.
Changes in population patterns	It is unlikely that future erosion events will cause changes in population patterns in Coventry.
Changes in land use development	It is possible that future erosion events will cause changes in land use development in Coventry. As erosion events become more frequent and more severe, areas in the Town are likely to be unsuitable for future development to reduce future damage to homes and infrastructure.

3.3.5 Tropical and Extratropical Storms (Hurricane and Nor'easter)

3.3.5.1 Description

Hurricane	Tropical cyclones, a general term for tropical storms and hurricanes, are low pressure systems that usually form over the tropics. These storms are referred to as "cyclones" due to their rotation. Tropical cyclones are among the most powerful and destructive meteorological systems on earth. Their destructive phenomena include very high winds, heavy rain, lightning, tornadoes, and storm surge. As tropical storms move inland, they can cause severe flooding, downed trees and power

	lines, and structural damage. There are three categories of tropical cyclones: • Tropical Depression: maximum sustained surface wind speed is less than 39 mph • Tropical Storm: maximum sustained surface wind speed from 39-73 mph • Hurricane: maximum sustained surface wind speed exceeds 73 mph Once a tropical cyclone no longer has tropical characteristics, it is classified as an extratropical system. Most Atlantic tropical cyclones begin as atmospheric "easterly waves" that propagate off the coast of Africa and cross the tropical North Atlantic and Caribbean Sea. When a storm starts to move toward the north, it begins to leave the area where the easterly trade winds prevail and enters the temperate latitudes where the westerly winds dominate. This situation produces the eastward curving pattern of most tropical storms that pass through the Mid-Atlantic region. When the westerly steering winds are strong, it is easier to predict where a hurricane will go. When the steering winds become weak, the storm follows an erratic path that makes forecasting very difficult. Storm surge is the abnormal rise in water level caused by the wind and pressure forces of a hurricane or Nor'easter. Nationally, storm surge flooding has caused billions of dollars in damage and hundreds of deaths. Given today's ever-increasing population densities in coastal states, the need for information about the potential for flooding from storm surge has become even more important. Further discussion on storm surge is not included in this plan, due to Coventry's inland location in central western Rhode Island.
Nor'easter	A Nor'easter is a strong area of low pressure along the East Coast of the United States that typically features winds from the northeast off the Atlantic Ocean. Nor'easters are most often associated with strong winter storms moving up the Northeast coast, but snow isn't a requirement for such a storm. These storms are most frequent and strongest between September and April but can occur any time of the year. The storm radius is often as large as 1,000 miles, and the horizontal storm speed is about 25 mph, traveling up the eastern United States coast. Sustained wind speeds of 10-40 mph are common during a nor'easter, with short term wind speeds gusting up to 70 mph. Typically a winter weather event, Nor'easters are known to produce heavy snow, rain, and heavy waves along the coast. Unlike hurricanes and tropical storms, Nor'easters can sit offshore, causing damage for days. Also called East Coast Winter Storms, Nor'easters are characterized by: • A closed circulation. • Located within the quadrilateral bounded at 45°N by 65°W and 70°W, and at 30°N by 85°W and 75°W. • Show a general movement from the south-southwest to the north-northeast. • Contain winds greater than 23 mph. • The above conditions must persist for at least a 12-hour period.

The Saffir-Simpson scale below is based primarily on wind speeds and is used to give an estimate of the potential property damage and flooding expected along the coast from a hurricane landfall.

Table 16- Saffir/Simpson Hurricane Wind Scale

Category	Sustained Winds (mph)	Damages
1	74-95	Very dangerous winds will produce some damage: Well-constructed frame homes could have damage to roof, shingles, vinyl siding and gutters. Large branches of trees will snap, and shallowly rooted trees may be toppled. Extensive damage to power lines and poles likely will result in power outages that could last a few to several days.
2	96-110	Extremely dangerous winds will cause extensive damage: Well-constructed frame homes could sustain major roof and siding damage. Many shallowly rooted trees will be snapped or uprooted and block numerous roads. Near-total power loss is expected with outages that could last from several days to weeks.
3 (major)	111-129	Devastating damage will occur: Well-built framed homes may incur major damage or removal of roof decking and gable ends. Many trees will be snapped or uprooted, blocking numerous roads. Electricity and water will be unavailable for several days to weeks after the storm passes.
4 (major)	130-156	Catastrophic damage will occur: Well-built framed homes can sustain severe damage with loss of most of the roof structure and/or some exterior walls. Most trees will be snapped or uprooted, and power poles downed. Fallen trees and power poles will isolate residential areas. Power outages will last weeks to possibly months. Most of the area will be uninhabitable for weeks or months.
5 (major)	157+	Catastrophic damage will occur: A high percentage of framed homes will be destroyed, with total roof failure and wall collapse. Fallen trees and power poles will isolate residential areas. Power outages will last for weeks to possibly months. Most of the area will be uninhabitable for weeks or months.

3.3.5.2 Location

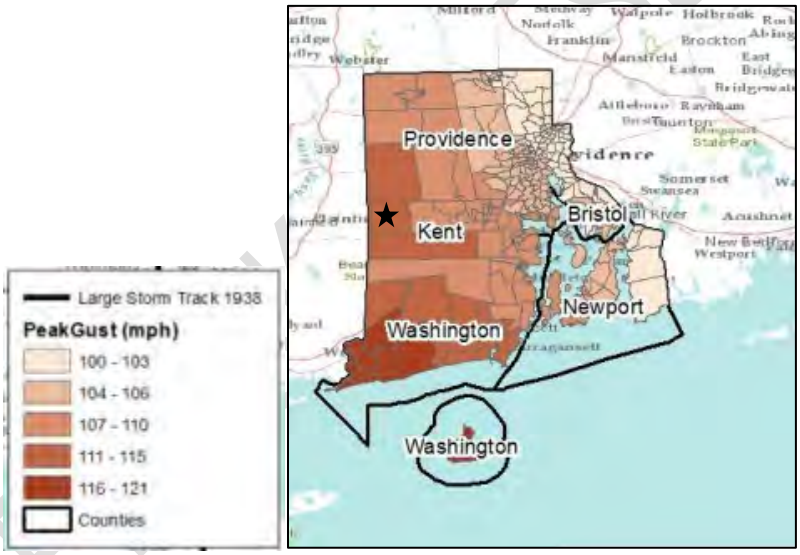
Although Coventry is not a coastal community, the Town's relative proximity to the Atlantic Ocean renders it particularly susceptible to hurricanes and Nor'easter, which may result in the loss of human life and property. All of Coventry is susceptible to the impacts of a hurricane or Nor'easter.

Figure 17 shows historical hurricane tracks within 20 miles of Coventry. Coventry is highlighted in red below.

3.3.5.3 Extent

Hurricane	Hurricanes that likely make it up to Rhode Island are usually weak (Category 1) or downgraded tropical systems. The wind speeds may be less, but the storms can still bring a lot of rain. Hurricanes are categorized according to the Saffir/Simpson scale (Table 16) with ratings determined by wind speed and central barometric pressure. Hurricane categories range from one (1) through five (5), with Category 5 being the strongest (winds greater than 155 mph). A hurricane watch is issued when hurricane conditions could occur within the next 36 hours. A hurricane warning indicates that sustained winds of at least 74 mph are expected within 24 hours or sooner. Figure 16 shows the statewide peak wind gust of the 1938 Great Hurricane. Coventry experienced a peak wind gust of 111-115 mph. Based on the extent of past events and the criteria identified in Table 7, the extent of

	hurricanes/tropical cyclones in Coventry is considered **Limited**, with potential for some injuries; short shutdown of some critical infrastructure and facilities; fewer than 10% of residential and commercial structures damaged; and a small number of local operations impacted for short amounts of time.
Nor'easter	The magnitude or severity of a severe winter storm or Nor'easter depends on several factors including a region's climatological susceptibility to snowstorms, snowfall amounts, snowfall rates, wind speeds, temperatures, visibility, storm duration, topography, and time of occurrence during the day (e.g., weekday versus weekend) and time of season. The extent of a severe winter storm (including Nor'easters that produce snow) can be classified by meteorological measurements and by evaluating its combined impacts. For measuring wind effects, the Beaufort Wind Scale is a system that relates wind speed to observed conditions at sea or on land (See Table 9). The snow impact of a Nor'easter can be measured using NOAA's Regional Snowfall Index (See Table 23). Based on the extent of past events and the criteria identified in Table 7, the extent of Nor'easters in Coventry is considered **Limited**, with potential for some injuries; short shutdown of some critical infrastructure and facilities; fewer than 10% of residential and commercial structures damaged; and a small number of local operations impacted for short amounts of time.



Source: RIEMA 2024

Figure 16- Peak Wind Gust of the 1938 Great Hurricane

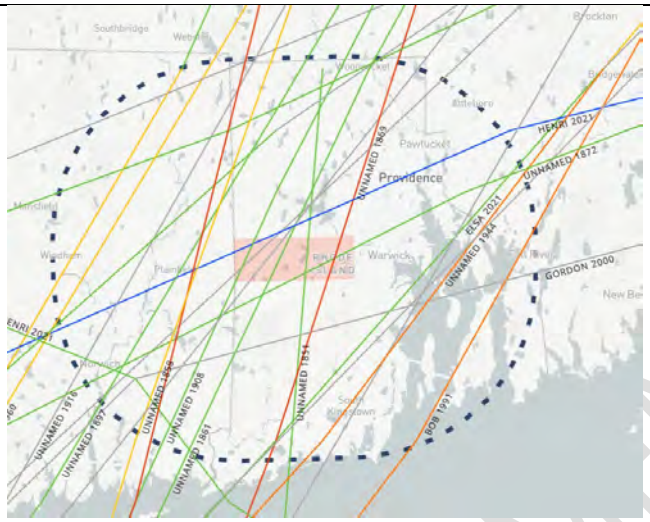
RIEMA states that Coventry has the following planning significance related to tropical and extratropical storms:

Jurisdiction	Tropical and Extratropical NRI	Tropical and Extratropical EAL
Coventry	Relatively Moderate	Relatively Moderate

Source: RIEMA 2024 NRI: National Risk Index EAL: Expected Annual Loss

3.3.5.4 History

Hurricane	Figure 17 shows historical hurricane tracks within 20 miles of Coventry. Coventry is highlighted in red below.



Source: NOAA 2024a

Figure 17- Historical Hurricane Tracks within 20 miles of Coventry

Table 17 provides details on the historical hurricanes that have come within 20 miles of Coventry. Since records began in 1842, 23 hurricanes or tropical storms have come within 20 miles of Coventry, with only 8 of them crossing into the Town.

Since the 2018 HMP, there have been 2 hurricanes that came within 20 miles of Coventry (Elsa and Henri, both in 2021).

Nor'easter

On average, Coventry experiences or is threatened by a Nor'easter every few years.

Table 19 describes historical Nor'easters that have impacted the entire State of Rhode Island, including Coventry. Since the 2018 HMP, there have been 0 Nor'easters that impacted Coventry.

Table 17- Historical Hurricanes within 20 miles Coventry or Impacted the Town

Storm Name	Max Category	Max Wind Speed (kt)	Impacts
Unnamed 1851	Tropical Storm	60	No record of damages in Coventry.
Unnamed 1858	Category 2	90	No record of damages in Coventry.
Unnamed 1861	Category 1	70	No record of damages in Coventry.
Unnamed 1869	Category 3	100	No record of damages in Coventry.
Unnamed 1872	Category 1	70	No record of damages in Coventry.
Unnamed 1888	Category 3	110	No record of damages in Coventry.
Unnamed 1888	Tropical Storm	50	No record of damages in Coventry.
Unnamed 1894	Category 3	105	No record of damages in Coventry.
Unnamed 1897	Tropical Storm	60	No record of damages in Coventry.
Unnamed 1902	Tropical Storm	50	No record of damages in Coventry.
Unnamed 1908	Category 1	65	No record of damages in Coventry.

Storm Name	Max Category	Max Wind Speed (kt)	Impacts
Unnamed 1915	Category 1	65	No record of damages in Coventry.
Unnamed 1916	Tropical Storm	40	No record of damages in Coventry.
Great New England Hurricane of 1938	Category 3	120	The unforeseen Great New England Hurricane of 1938 is the most catastrophic weather event in Rhode Island and history. The event occurred slightly before high tide and brought with it winds upward of 120 mph. A tidal surge inundated the City of Providence with over 10' of water. Coventry suffered loss of power and damage to houses and buildings. In Western Coventry, the dam had to be raised at Roaring Brook in Hopkins Hollow to float logs and trees that came down in the storm.
Unnamed 1944	Category 2	85	No record of damages in Coventry.
Carol 1954	Category 3	100	The hurricane resulted in house and tree damage around Coventry.
Donna 1960	Category 4	125	No record of damages in Coventry.
Bob 1991	Category 2	115	The hurricane damaged business and homes as well as took down numerous trees and utility lines in Coventry.
Gordon 2000	Category 1	70	No record of damages in Coventry.
Barry 2007	Tropical Storm	50	No record of damages in Coventry.
Hanna 2008	Category 1	75	No record of damages in Coventry.
Irene 2011	Category 3	105	Hurricane Irene hit Coventry as a tropical storm. Despite the relatively low wind speeds, sustained winds over a 6 to 12-hour long duration resulted in widespread tree damage and resulted in power outages to roughly half a million customers throughout the state. Numerous trees, poles, and wires were downed throughout Coventry. Wind gusts of 52 knots were observed locally. Collective effects throughout Massachusetts and Rhode Island resulted in 1 fatality, no injuries, and $127.3 million in property damage.
Sandy 2012	Category 3	100	In October 2012, Hurricane Sandy severely impacted coastal Rhode Island as it came ashore with Tropical Storm strength winds. Peak wind speeds in Coventry were 63-68 mph. Being inland, Coventry was spared the storm surge but suffered minor damage throughout the town due to high winds and rain. There were widespread power outages and a backlog of requests for downed tree removal which restricted access to roads and private property.
Andrea 2013	Tropical Storm	55	No record of damages in Coventry.
Elsa 2021	Category 1	75	No record of damages in Coventry.
Henri 2021	Category 1	65	Henri is the strongest tropical cyclone to pass over New England since Tropical Storm Bertha in July of 1996. The storm brought 2 inches of rain to Coventry, nearly 50% of Town residents were left without power, electrical wires and transformers were on the roads, and many roads were partially blocked by fallen debris. The following roads were completely impassable:

Storm Name	Max Category	Max Wind Speed (kt)	Impacts
			• BlackRock Road, in the areas of Routes 292 and 320 • Nelson Capwell Road • Waterman Hill Road at Tillinghast Road • Town Farm Road, from the 117 End and the Maple Valley End • Isack Fiske Number 5 & Lionel Pierson

Source: NOAA 2024a

Rhode Island has experienced ten (10) Presidential Disaster Declarations related to hurricanes or tropical storms (Table 18). Coventry was not severely impacted by any of these disasters. Since the 2018 HMP, there has been one (1) Rhode Island Presidential Disaster Declarations relating to hurricanes or tropical storms (Hurricane Henri).

Table 18- State of Rhode Island Presidentially Declared Disasters Relating to Hurricanes

Designation	Incident Period	Declaration Date	Incident Type
DR-23-RI	09/02/1954	09/02/1954	Hurricane
DR-39-RI	08/20/1955	08/20/1955	Hurricane and Flood
DR-748-RI	09/27/1985	10/15/1985	Hurricane Gloria
DR-913-RI	08/19/1991	08/26/1991	Hurricane Bob
EM-3255-RI	08/29 – 10/01/2005	09/18/2005	Hurricane Evacuation (Katrina)
EM-3334-RI	08/26 – 08/29/2011	08/27/2011	Hurricane Irene
DR-4027-RI	08/27 – 08/29/2011	09/03/2011	Tropical Storm Irene
EM-3355-RI	10/26 – 11/08/2012	10/29/2012	Hurricane Sandy
DR-4089-RI	10/26 – 10/31/2012	11/03/2012	Hurricane Sandy
EM-3563-RI	08/20 – 08/24/2021	08/21/2021	Hurricane Henri

Source: FEMA 2024

Table 19- Historical Nor'easters in Rhode Island

Date	Comments
2/10/1969	Up to 20 inches of snow in parts of Rhode Island
2/6/1978	Catastrophic snow storm in Southern New England. 3’ of snow reported in Providence.
2/11/1994	Major Nor’easter. School closed by noon, business, and highway travel disrupted.
2/23/1998	The second powerful nor'easter to affect the region in less than a week brought heavy rainfall and strong northeast winds to much of Rhode Island. An extremely intense low pressure system moving to the northeast and passing just to the southeast of Nantucket had a central barometric pressure just under 29 inches of mercury. Rainfall totals for this storm exceeded 2 inches over the eastern and northern part of the state. A total of 2 inches fell in Coventry.
5/25/2005	Late season Nor’easter brought strong winds and heavy rains, some gusts as high as 60 mph.
2/12/2006	Heavy snow (9.4 inches at T.F. Green) and windy conditions
10/29/2011	A rare and historic October Nor'easter brought very heavy snow to portions of southern New England on

Date	Comments
	Saturday October 29. Low pressure tracked northeast from the North Carolina coast Saturday morning, rapidly strengthening as it passed well south of Nantucket Saturday evening. As the storm intensified, colder air from aloft was drawn into New England resulting in heavy snow in the interior. 2-3 inches of snow fell across eastern Kent County.
1/26/2015	An Alberta clipper that turned into a strong Nor'easter brought heavy snow and strong winds to the region. About a foot and a half of snow fell across western Kent County.
2/18/2015	An Alberta clipper that turned into a strong Nor'easter brought heavy snow and strong winds to the region. About a foot and a half of snow fell across western Kent County.
1/21/2016	Strong wind and snow. -8 inches of snow in western Kent County
3/14/2017	Heavy wet snow followed by plunging temps hampered roads. 9 inches of snow were reported in Coventry.

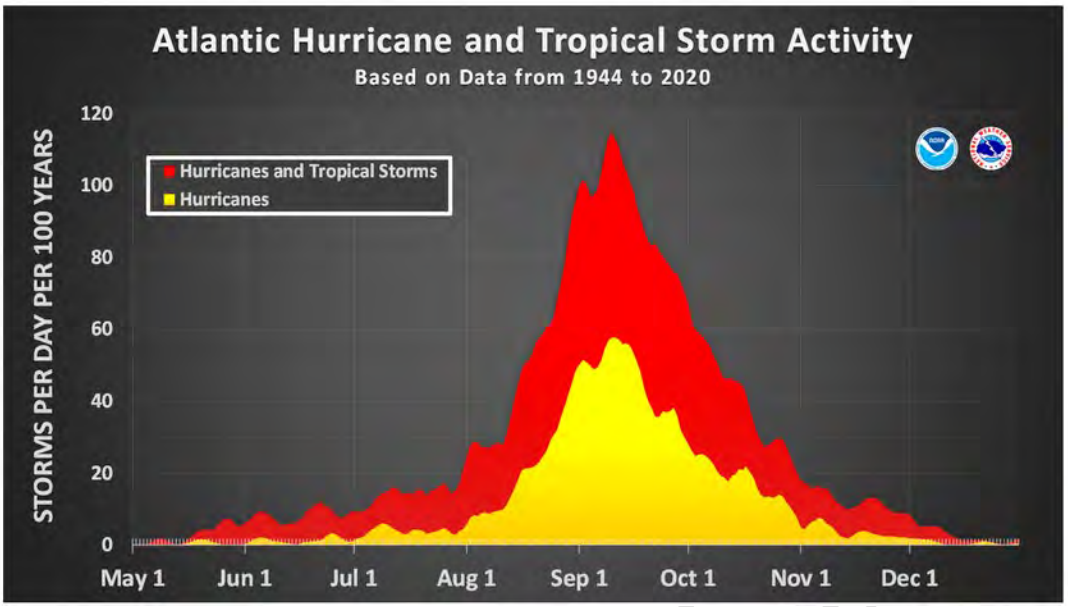
Source: NOAA Storm Events Database- Storm Prediction Center Product (NWS 2024a)

3.3.5.5 Impact

Hurricane	The wind and rain that precedes a hurricane can cause severe damage even to those communities that are further inland, such as Coventry. As Coventry is an inland community, most damage from a hurricane would be from downed power lines, downed trees, and damage to mobile homes or older structures.
Nor'easter	Coventry is an inland community; most damage would be from downed power lines, downed trees, and damage to mobile homes or older structures. The Blizzard of 1978 was the largest Nor'easter on record. Many people were without heat, food, and electricity for over a week.

3.3.5.6 Probability of Future Occurrence

Hurricane	The official hurricane season for the Atlantic basin is from June 1 to November 30, but tropical cyclone activity sometimes occurs before and after these dates. The peak of the Atlantic hurricane season is September 10, with most activity occurring between mid-August and mid-October. Figure 18 shows the seasonal distribution of Atlantic hurricane and tropical storm activity from 1944-2020. Hurricanes occur annually in the Atlantic Ocean, but based on previous occurrences and the criteria identified in Table 8, it is **Possible** a hurricane will impact Coventry in the calendar year; there is a between 1-49.9% annual probability of occurring.
Nor'easter	Based on previous occurrences and the criteria identified in Table 8, it is **Possible** a Nor'easter will impact Coventry in the calendar year; there is a between 1-49.9% annual probability of occurring.



Source: NOAA NHC 2021

Figure 18- Atlantic Hurricane and Tropical Storm Activity (1944-2020)

3.3.5.7 Future Conditions Including Climate Change

Hurricane	Nature of the hazard	The physics driving the global climate are complicated thus it is difficult to be certain how climate change will influence the intensity, frequency, and geographical distribution of hurricanes. Some effects of climate change, like rising sea surface temperatures, are likely to favor hurricane development and intensification. Other meteorological effects (such as increasing upper troposphere temperature and vertical wind shear) of climate change are not likely believed to be favorable for hurricane formation (EC4 STAB 2016).
	Location	The warming of mid-latitudes may be changing the pattern of tropical storms, leading to more storms occurring at higher latitudes. A northward shift in the location at which storms reach their peak intensity has been observed in the Pacific, but not in the North Atlantic, where hurricanes that make landfall in the Gulf and East Coast are created. This shift makes it possible to put more lives and property at risk, however more research is required to better understand how hurricane tracks might change (C2ES 2024).
	Extent	Warmer sea surface temperatures intensify tropical storm wind speeds, giving them the potential to deliver more damage if they make landfall. Over the 39-year period from 1979-2017, the number of major hurricanes has increased while the number of smaller hurricanes has decreased. Based on modeling, the National Oceanic and Atmospheric Administration predicts an increase in Category 4 and 5 hurricanes, alongside increased hurricane wind speeds. Warmer sea temperatures also cause wetter hurricanes, with 10-15 percent more precipitation from storms projected (C2ES 2024). Scientists are currently uncertain whether there will be a change in the number of future hurricanes, but report that it is possible that the intensity and severity of hurricanes will continue to increase due to (C2ES 2024).
	Impact	While the impact of climate change on the frequency of storms in the Atlantic Basin remains uncertain, the predicted changes in storm activity could make it

		likely to change the frequency and intensity of associated storm surges, high winds, and precipitation events, causing serious implications for both coastal and inland communities and infrastructure systems in Rhode Island (Resilient Rhody 2018).
	Probability of Future Events	In the Atlantic basin, modeling studies predict a substantial reduction in the number of tropical storms and hurricanes, but the frequency of intense storms (Category 4 and 5) is likely to increase and possibly double by the end of the 21st century (EC4 STAB 2016).
	Changes in population patterns	As hurricanes are a regional hazard and Coventry is an inland community, it is possible that climate change will influence future conditions impacting population patterns if residents need to relocate due to flooding associated with hurricanes. It is also possible that residents could relocate to another area within the Town.
	Changes in land use development	With increased intensities and heavier rain, future hurricanes may possibly impact future land use development by altering floodplains/flood hazard areas, and increase erosion. These impacts may result in infrastructure relocation or prohibiting future development in these areas. However, as Coventry is an inland community, future changes in sea level rise and storm surges are not likely to alter land use development in the Town.
Nor'easter	Nature of the hazard	Similar to hurricanes, changes in air and water temperatures are likely to lead to stronger Nor'easters along the Atlantic Ocean. Coventry should expect stronger Nor'easters in the future, but not necessarily more frequent storms.
	Location	Nor'easters are a predicable annual hazard associated with the Atlantic Ocean. Climate change is not likely to alter the location of future Nor'easter events in Coventry as a Nor'easter would be a regional event, affecting more areas than just the Town.
	Extent	The 2024 State of Rhode Island HMP states: *For extratropical storms, particularly Nor'easters, the increase in intensity is caused by changes in atmospheric conditions, including temperature gradients, which can affect the strength and track of these storms.* *Both tropical and extratropical storms are expected to produce heavier rainfall in a warmer climate. This can lead to more significant inland flooding and exacerbate the risk of river and urban flooding* (RIEMA 2024). It is likely that climate change will influence the extent of Nor'easters occurring in Coventry.
	Impact	As the extent/intensity of future Nor'easter is projected to increase, the impacts to the infrastructure and residents of Coventry will likely increase. Increased impacted are likely to include increased flooding and resultant erosion, increased snow/ice storms are likely to lead to power/utility outages, road closures, and travel disruptions.
	Probability of Future Events	Similar to hurricanes, changes in air and water temperatures will lead to stronger Nor'easters along the Atlantic Ocean. Coventry will likely see stronger Nor'easters in the future, but not necessarily more frequent storms.
	Changes in population patterns	As Nor'easters are a regional hazard and Coventry is an inland community, it is possible that future conditions would impact future population patterns if flooding occurs requiring residents to relocate.
	Changes in	With increased intensities and heavier rain/snowfall, future Nor'easters are likely

	land use development	to impact future land use development by altering floodplains/flood hazard areas, and increase erosion. These impacts are likely to result in infrastructure relocation or prohibiting future development in these areas.

3.3.6 Severe Winter Weather (Snow Storm, Ice Storm)

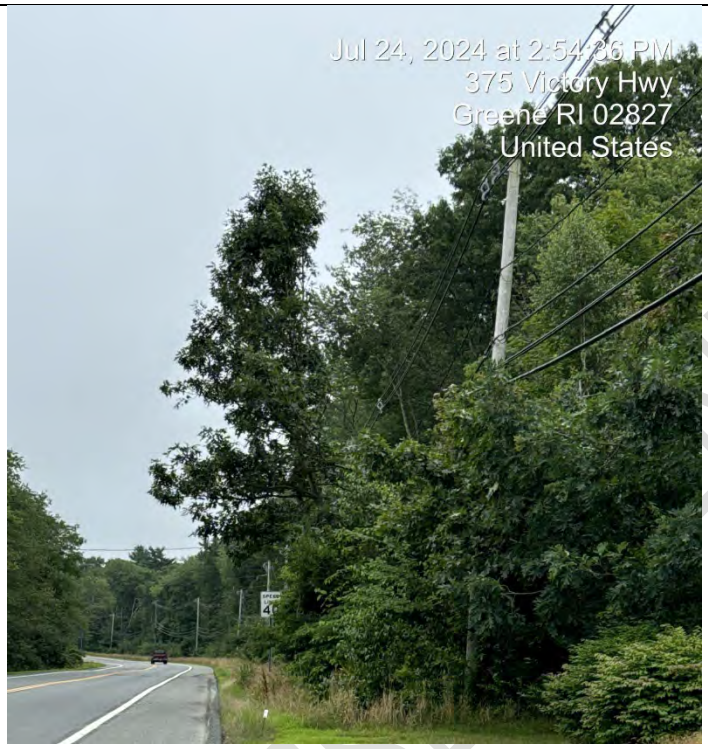
This hazard profile includes information on snow storm and ice storm events.

3.3.6.1 Description

Snow Storm	A winter storm is a combination of heavy snow, blowing snow, and/or dangerous wind chills. A winter storm can be life-threatening. A snowstorm is an example of a winter storm. A snow storm occurs when a mass of very cold air moves away from the polar region and collides with a warm air mass. The warm air rises quickly and the cold air cuts underneath it, causing huge cloud banks to form. As the ice crystals within the cloud collide, snow is formed. However, snow will only fall from the cloud if the temperature of the air between the bottom of the cloud and the ground is below 40 degrees Fahrenheit. A higher temperature will cause the snowflakes to melt as they fall through the air, turning them into rain or sleet. Similar to ice storms, the effects from a snow storm can disturb a community for a prolonged period of time. Buildings and trees can collapse under the weight of heavy snow. Winter storms vary in size and strength and can be accompanied by strong winds that create blizzard conditions and dangerous wind chills. A blizzard as a specific type of snowstorm that consist of large amounts of snow or blowing snow, winds greater than 35 mph, and visibility of less than ¼ mile for at least three hours.
Ice Storm	Ice storms are characterized by the accumulation of freezing rain or freezing drizzle, which coats surfaces with a layer of ice. These storms can have significant impacts on transportation, infrastructure, and the environment. Ice storms occur when there is a layer of warm air above a layer of cold air near the surface. Precipitation falls as rain in the warm layer and then freezes upon contact with surfaces at or below freezing temperatures in the cold layer. The most common type of precipitation during an ice storm is freezing rain. This is rain that falls as a liquid but freezes upon contact with cold surfaces, forming a layer of ice (RIEMA 2024).

3.3.6.2 Location

Snow Storm	The majority of Rhode Island lies outside the heavy snow and ice regions of the northeast. Due to its maritime climate, Rhode Island generally experiences cooler summers and warmer winters than inland areas. However, snow does occur and can be more than an inconvenience and cause extensive damage. The two major threats from heavy snow are stranded populations and snow loading on rooftops. All of Coventry is susceptible to snow storms. Roads, trees, and power lines will be the most affected. In Coventry, the power companies are responsible for trimming trees near powerlines, however, they do not trim above the powerlines (Figure 19). This frequently leads to downed powerlines and power outages when heavy snow or ice is deposited on the trees.

	 Photo Credit: Fairweather Science, LLC **Figure 19- Trees Above Powerlines in Coventry (July 2024)**
Ice Storm	All of Coventry is susceptible to ice storms. Roads, trees, and power lines will be the most affected.

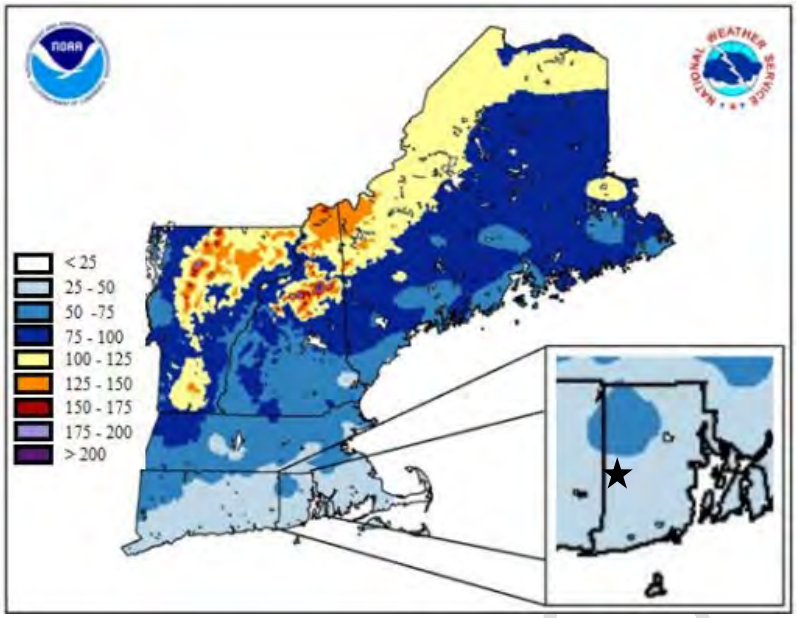
3.3.6.3 Extent

Snow Storm	Figure 20 shows average snowfall amounts in inches for the state. Coventry lies on the border of the 25-50 inch and the 50–75-inch categories. On average, Coventry receives 25-30 inches of snow per year. Based on the extent of past events and the criteria identified in Table 7, the extent of snow storms in Coventry is considered **Limited**, with potential for some injuries; short shutdown of some critical infrastructure and facilities; fewer than 10% of residential and commercial structures damaged; and a small number of local operations impacted for short amounts of time.
Ice Storm	Ice storms can be the most devastating winter weather phenomena and are often the cause of automobile accidents, power and communication system outages, personal injury, and death. Moreover, they can hinder the delivery of emergency services needed in response to these catastrophes and endanger the responders. Ice storms accompanied by wind gusts cause the most damage. Significant ice accumulations are usually accumulations of ¼" or greater. The Sperry–Piltz Ice Accumulation (SPIA) Index is a scale for rating ice storm intensity, based on the expected storm size, ice accumulation, and damages on structures, especially exposed overhead utility systems (Table 20). The SPIA Index uses forecast information to rate an upcoming ice storm's impact from 0 (little impact) to 5 (catastrophic damage to exposed utility systems). Coventry expects at least a level 1 (isolated or localized utility interruptions) every year due to ice. Based on the extent of past events and the criteria identified in Table 7, the extent of ice storms

	in Coventry is considered **Limited**, with potential for some injuries; short shutdown of some critical infrastructure and facilities; fewer than 10% of residential and commercial structures damaged; and a small number of local operations impacted for short amounts of time.

Table 20- The Sperry-Piltz Ice Accumulation Index

Ice damage index	Radial ice	Wind	Damage and impact descriptions
0	0–0.25 in	0-15 mph	Minimal risk of damage to exposed utility systems; no alerts or advisories needed for crews, few outages.
1	0.10–0.25 in	15–25 mph	Some isolated or localized utility interruptions are possible, typically lasting only a few hours. Roads and bridges may become slick and hazardous.
	0.25–0.50 in	0–15 mph	
2	0.10–0.25 in	25–35 mph	Scattered utility interruptions expected, typically lasting 12 to 24 hours. Roads and travel conditions may be extremely hazardous due to ice accumulation.
	0.25–0.50 in	15–25 mph	
	0.50–0.75 in	0–15 mph	
3	0.10–0.25 in	Over 35 mph	Numerous utility interruptions with some damage to main feeder lines and equipment expected. Tree limb damage is excessive. Outages lasting 1 to 5 days.
	0.25–0.50 in	25–35 mph	
	0.50–0.75 in	15–25 mph	
	0.75–1.00 in	0–15 mph	
4	0.25–0.50 in	Over 35 mph	Prolonged and widespread utility interruptions with extensive damage to main distribution feeder lines and some high voltage transmission lines/structures. Outages lasting 5 to 10 days.
	0.50–0.75 in	25–35 mph	
	0.75–1.00 in	15–25 mph	
	1.00–1.50 in	0–15 mph	
5	0.50–0.75 in	Over 35 mph	Catastrophic damage to entire exposed utility systems, including both distribution and transmission networks. Outages could last several weeks in some areas. Shelters needed.
	0.75–1.00 in	Over 25 mph	
	1.00–1.50 in	Over 15 mph	
	Over 1.50 in	Any	



Source: NOAA per RIEMA 2024

Figure 20- Rhode Island Average Annual Snowfall (1991-2020)

RIEMA states that Coventry has the following planning significance related to severe winter weather:

Jurisdiction	Ice Storm NRI	Ice Storm EAL	Winter Weather NRI	Winter Weather EAL
Coventry	Relatively Low	Relatively Low	Relatively Low	Relatively Low

Source: RIEMA 2024 NRI: National Risk Index EAL: Expected Annual Loss

3.3.6.4 History

Snow Storm	Table 21 provides details on historical heavy snow and snow storm events in Coventry. Since the 2018 HMP, there has been one (1) heavy snow or snow storm event in Coventry.
Ice Storm	Table 21 provides details on historical ice storm events in Coventry. Due to the unique weather in New England, ice storms are usually part of larger snow events. The winter storm event that crippled the state in February 1978 did include a FEMA disaster declaration for snow and ice. Subsequent storms have included ice warnings when there are rapidly warming and cooling temperatures. Since the 2018 HMP, there has been zero (0) standalone ice storm events in Coventry.

Table 21- History of Severe Winter Weather Events in Coventry

Date	Event Type	Event Details
1/2/1996	Heavy Snow	A strong low pressure system moved from Tennessee to the Virginia coast and then northeast off the New Jersey coast, passing southeast of Cape Cod. This system produced heavy snow across the central and northern part of the state. 9.5 inches fell in Coventry.
1/7/1996	Heavy Snow	An intense east coast low pressure system moved northeast from eastern Georgia, passing along the coast of the Carolinas and then close to 40 degrees North and 70 degrees West. This storm was one of the most significant winter storms to hit southern New England in the past 20 years and was named the Blizzard of '96" from the Middle Atlantic states into

Date	Event Type	Event Details
		New England. Coventry recorded 27 inches of snow
1/20/2001	Heavy Snow	Heavy snow fell across all of Rhode Island. The highest snowfall totals were found in Providence, Bristol, and Newport Counties, where as much as 8 inches of snow were recorded. Since the storm occurred over the weekend, impact on travel was kept to a minimum, but there were still several minor accidents throughout the state. Only a few hundred electric customers were left without power. Some snowfall totals from the storm include 8 inches in Tiverton, East Providence, Woonsocket, and Johnston; 7 inches in Burrillville, Cranston, Foster, and West Warwick; and 6 inches in Cumberland, Coventry, and North Kingstown.
2/7/2003	Winter Storm	A winter storm passing southeast of Nantucket brought heavy snow to Rhode Island. Amounts of 6 to 12 inches were common, with the greatest amounts in the higher elevations of northern Providence County. No significant storm damage was reported, mainly due to the fluffy, light nature of the snow as temperatures fell into the teens and 20s during the height of the storm. The main impact was to travel, as police and fire departments responded to numerous fender-benders. No injuries were reported. Officially, the storm total at T.F. Green State Airport in Warwick was 7.2 inches. Other snowfall totals as reported by trained spotters included 13 inches in Burrillville and Woonsocket; 12 inches in North Foster and North Smithfield; 11 inches in West Coventry and downtown Providence; 10 inches in Johnston and Cranston; 8 inches in Smithfield, West Warwick, North Kingstown, Tiverton, and Portsmouth; and 6 inches in Middletown.
2/17/2003	Winter Storm	A major winter storm impacted southern New England with heavy snow and strong winds as it tracked southeast of Nantucket. Snowfall totals of one to two feet were widely observed throughout Rhode Island. No significant damage was reported due to the storm, primarily since the snow was fluffy and light with temperatures in the teens and 20s. Impact on travel was minimal since the storm affected the region on Presidents Day and most schools were closed that week. However, there were numerous reports of minor accidents as a result of slippery roads. No injuries were reported. 15 inches was reported in Coventry.
3/6/2003	Winter Storm	A fast moving winter storm passing south of New England brought heavy snow to Rhode Island, where totals of 6 to 10 inches were common. Although dozens of minor accidents were reported as a result of poor visibility and slippery roads, the overall impact of this late season storm was far less on the Ocean State than to areas in adjacent southeast Massachusetts. 8 inches was reported in Coventry.
1/27/2004	Winter Storm	A winter storm tracking south of New England brought heavy snow to southern New England, from western Massachusetts into much of Connecticut and southern Rhode Island. Snowfall totals of 4 to 8 inches were common in areas to the west and south of Providence. 7 inches was reported in Coventry.
1/22/2005	Winter Storm	A major winter storm brought heavy snow, high winds, and coastal flooding to southern New England. In Rhode Island, snowfall totals of 15 to 25 inches were widely observed. Winds gusting as high as 60 mph at times (mainly around greater Providence) created near blizzard conditions at times, making travel impossible during the height of the storm. 18 inches fell in Coventry.
3/23/2005	Heavy Snow	Low pressure off the Virginia coast tracked well southeast of New England, but brought pockets of heavy snow to northwest Rhode Island. Totals of 4 to 8 inches were common throughout western Kent and northwest Providence counties, with as little as 1 to 3 inches near the coast. This late season storm had little impact on travel, although several minor accidents were reported.

Date	Event Type	Event Details
		Officially, the snowfall total at T.F. Greene State Airport in Warwick was 2.1 inches. Other snowfall totals, as reported by trained spotters, included 9 inches in Foster and Burrillville, 8 inches in Scituate, and 6 inches in Coventry and Johnston.
2/5/2016	Heavy Snow	Low pressure traveling along a cold front stalled south of southern New England brought heavy rain, which changed over to heavy snow as temperatures dropped. This snow was extraordinarily wet and heavy, bringing down trees and wires across portions of southern New England. One to nine inches of snow fell across western Kent County. In addition, heavy snow downed trees on Flat River Road and Page Drive in Coventry.
3/14/2017	Heavy Snow	A major winter storm moved up the east coast, hugging the southern NJ coast then moving rapidly northeast across southern Rhode Island and interior southeast Massachusetts. In Rhode Island, snowfall amounts were highest in the northwest hills, where a changeover to sleet and rain did not happen until late in the afternoon. Along the south coast, only 2 to 6 inches fell, but more around a foot occurred in northwest Kent County. Strong/damaging winds gusted to 45 to 60 mph across much of Rhode Island. Snow began falling off-and-on before daybreak, then heavy snow fell during the morning hours. A trained spotter reported 9.0 inches in Coventry, RI.
2/14/2018	Winter Weather	An area of light freezing rain moved across Rhode Island during the morning rush hour, causing numerous traffic accidents and a few road closures due to icing. At 7:14 AM EST in Coventry, two multiple vehicle accidents were reported including on Victory Highway.
3/13/2018	Winter Storm	Low pressure along the Carolina coast March 12 moved up the coast and passed offshore of Southern New England on March 13, moving off through the Maritimes on March 14. The storm brought snow accumulations of up to two feet in Northern Rhode Island and up to one foot in Southern Rhode Island. The storm also brought wind gusts of up to fifty miles per hour to coastal Rhode Island. Blizzard conditions were observed at Newport State Airport in Middletown. From fourteen to sixteen inches of snow fell on Western Kent County. At 11:10 AM EST a tree came down on a house on Old North Road in Coventry.
1/7/2022	Heavy Snow	A low pressure system passing southeast of New England brought widespread snow, especially for northern RI. Snow began around midnight and continued into Friday with the period of greatest snow accumulation in the early to late morning hours. This impacted travel during the morning commute. 10 to 14 inches fell in the I-95 corridor. Snowfall ranged from 5 to 7 inches with the highest amount reported in Coventry.

Source: NOAA Storm Events Database- Storm Prediction Center Product (NWS 2024a)

Additionally, Rhode Island has experienced nine (9) Presidential Disaster Declarations related to severe winter storms (Table 22). Coventry was not severely impacted by any of these disasters. Since the 2018 HMP, there has been 1 Rhode Island Presidential Disaster Declaration relating to winter storms.

Table 22- State of Rhode Island Presidentially Declared Disasters Relating to Winter Storms

Designation	Incident Period	Declaration Date	Incident Type
EM-3058-RI	02/07/1978	02/07/1978	Blizzards and Snowstorms
DR-548-RI	02/16/1978	02/16/1978	Snow and Ice
EM-3102-RI	03/13 – 03/16/1993	03/16/1993	Blizzards, High Winds, Record Snowfall
DR-1091-RI	01/07 – 01/13/1996	01/24/1996	Blizzard

Designation	Incident Period	Declaration Date	Incident Type
EM-3182-RI	02/17 – 02/18/2003	03/27/2003	Snowstorm
EM-3203-RI	01/22 – 01/23/2005	02/17/2005	Heavy Snow
DR-4107-RI	02/08 – 02/09/2013	03/22/2013	Severe Winter Storm and Snowstorm
DR-4212-RI	01/26 – 01/28/2015	04/03/2015	Severe Winter Storm and Snowstorm
DR-4653-RI	01/28 – 01/29/2022	05/12/2022	Severe Winter Storm and Snowstorm

Source: FEMA 2024

3.3.6.5 Impact

Snow Storm	The Northeast Snowfall Impact Scale is a scale used to assess and rank the impact of snowfall events in the northeastern United States. It was developed by NOAA to provide a standardized way of measuring the societal and economic impacts of snowstorms (RIEMA 2024). The scale considers factors such as snowfall amount, population density, and the area affected by the storm to determine its impact. The scale has five categories, each with its own associated impacts As described in the 2024 State of Rhode Island HMP, impacts on people and the community from winter storms may include: • **Injuries and Fatalities**: Slippery sidewalks, roads, and driveways can lead to slip and fall accidents, vehicle crashes, and pedestrian injuries. Exposure to extreme cold temperatures can cause frostbite, hypothermia, and cold-related illnesses, which can be life-threatening. • **Power Outages**: Heavy snow, ice, and freezing rain can bring down power lines and disrupt electricity supply. Power outages can lead to heating and lighting challenges, particularly in extreme cold conditions. • **Transportation Disruptions**: Winter storms can make roads and highways treacherous, leading to travel delays, accidents, and stranded motorists. Public transportation services may be disrupted, affecting commuters and essential travel. • **Stranded or Isolated Communities**: Severe winter weather can leave communities isolated and cut off from emergency services and supplies. Residents may need to shelter in place or rely on local resources until conditions improve. • **Health Risks**: Exposure to extreme cold can lead to a range of health risks, including frostbite, hypothermia, and cold-related illnesses. Individuals with pre-existing health conditions may face exacerbated risks. • **Increased Heating Costs**: Cold weather can result in higher heating costs, which can be a financial burden for many households. Low-income individuals and families may struggle to afford adequate heating. • **Disruption of Essential Services**: Severe winter weather can disrupt essential services such as healthcare, emergency response, and utilities. Hospitals may face increased patient volumes due to weather-related injuries and illnesses. Additionally, the 2024 State of Rhode Island HMP, describes impacts on critical facilities and infrastructure: • **Power Outages**: Severe winter storms can cause power outages by bringing down power lines, causing ice accumulation on electrical infrastructure, or overloading the electrical grid due to increased demand for heating. Critical facilities such as hospitals, emergency response centers, and data centers may rely on backup generators to maintain essential

	operations during outages. • **Communication Disruptions**: Ice and freezing rain can damage communication infrastructure, including cell towers, telephone lines, and data centers, leading to disruptions in phone and internet services. This can hinder emergency communication and coordination, affecting critical response efforts. • **Transportation Disruptions**: Snow and ice accumulation on roads, runways, and railways can disrupt transportation networks, leading to travel delays, accidents, and closures. Critical facilities may face challenges in receiving essential supplies and personnel during and after the storm. • **Healthcare System Strain**: Hospitals and healthcare facilities may experience increased demand for medical services due to storm-related injuries and illnesses, including those related to slips and falls, traffic accidents, and cold exposure. • **Water Supply Interruptions**: Freezing temperatures can cause water pipes to burst, leading to water supply interruptions and damage to water infrastructure. Critical facilities such as hospitals and emergency response centers rely on a continuous supply of clean water for various purposes, including patient care and firefighting. • **Wastewater Systems**: Cold temperatures can affect wastewater treatment plants, leading to potential operational disruptions and contamination risks. • **Fuel Supply Disruptions**: Snow and ice can disrupt fuel supply chains, leading to shortages of gasoline, diesel, and heating oil. Critical facilities may rely on fuel for backup power generators and heating systems. • **Property Damage**: Severe winter storms can result in property damage, including roof collapses due to heavy snow accumulation, ice damming, and frozen pipes. Past snow storms in Coventry have caused power outages and caused schools and businesses to shut down for multiple days. During a heavy snow storm, the Town may activate their shelters for people without power.
Ice Storm	In Coventry, ice accumulation on trees leads to downed powerlines and loss of utilities. Icy roads can also cause dangerous driving conditions.

Table 23- Northeast Snowfall Impact Scale

Category	Description	Impacts
1	Notable	• Light to moderate snowfall. • Limited impacts on transportation and daily life. • Typically localized to small areas.
2	Significant	• Moderate to heavy snowfall. • Widespread impacts on transportation, including delays and disruptions. • Some school and business closures. • Widespread power outages are rare.
3	Major	• Heavy snowfall, often exceeding one foot or more. • Significant transportation disruptions, including major highway closures. • Widespread school and business closures. • Power outages may occur, especially in areas with wet, heavy snow.
4	Crippling	• Extreme snowfall, often exceeding two feet or more. • Severe and prolonged transportation disruptions, including highway closures. • Widespread school and business closures for an extended period.

Category	Description	Impacts
		• Widespread and prolonged power outages, especially in areas with ice accumulation.
5	Extreme	• Exceptional snowfall, often exceeding three feet or more. • Complete paralysis of transportation systems, including major highways and airports. • Extended school and business closures. • Widespread and prolonged power outages with significant damage to the electrical infrastructure.

Source: RIEMA 2024

3.3.6.6 Probability of Future Occurrence

Snow Storm	Based on previous occurrences and the criteria identified in Table 8, it is **Highly Likely** that Coventry will experience a heavy snow/snow storm event within the calendar year; there is a greater than 90% annual probability of occurring.
Ice Storm	Based on previous occurrences and the criteria identified in Table 8, it is **Highly Likely** that Coventry will experience an ice storm event within the calendar year; there is a greater than 90% annual probability of occurring.

3.3.6.7 Future Conditions Including Climate Change

Snow Storm and Ice Storm	Nature of the hazard	The 2024 State of Rhode Island HMP states: *Climate change can lead to greater variability in precipitation patterns. In Rhode Island, this may result in more erratic and intense winter storms with periods of heavy snowfall followed by rain or freezing rain. These mixed precipitation events can make winter storms more challenging to predict and can lead to a greater risk of ice accumulation.* It is possible that the nature of Snow and Ice Storms could change in the future due to climate change.
	Location	The 2024 State of Rhode Island HMP states: *Changes in atmospheric circulation patterns associated with climate change can influence the tracks of winter storms. This could lead to a shift in the amounts of heavy snowfall, ice, and other winter weather hazards in Rhode Island (RIEMA 2024).* It is possible that the location of Snow and Ice Storms could change in the future due to climate change.
	Extent	The 2024 State of Rhode Island HMP states: *Rhode Island may experience milder winters as average temperatures rise due to climate change. While this could lead to a decrease in the frequency of traditional snowstorms, it may also increase the likelihood of winter storms that produce mixed precipitation, including freezing rain and sleet. Warmer temperatures can lead to a higher snowfall threshold, meaning that storms that would have produced snow in the past may now bring more rain or a mix of precipitation types. This can affect the accumulation of snow in the state.* *Changes in atmospheric circulation patterns associated with climate change can influence the tracks of winter storms. This could lead to a shift in the amounts of heavy snowfall, ice, and other winter weather hazards in Rhode Island* (RIEMA 2024). It is possible that the extent of Snow and Ice Storms could change in the future

		due to climate change.
	Impact	Climate change will likely increase impacts to the Town from snow storm events. Higher temperatures allow the atmosphere to hold more water, which creates more precipitation and makes it more likely to fall quickly. This influence will likely cause more snow to fall in shorter periods of time, leading to road and travel hazards, increased snow loads, and the potential for snow-related injuries from shoveling more amounts of snow.
	Probability of Future Events	The 2024 State of Rhode Island HMP states: *Rhode Island may experience milder winters as average temperatures rise due to climate change. While this could lead to a decrease in the frequency of traditional snowstorms, it may also increase the likelihood of winter storms that produce mixed precipitation, including freezing rain and sleet. Warmer temperatures can lead to a higher snowfall threshold, meaning that storms that would have produced snow in the past may now bring more rain or a mix of precipitation types. This can affect the accumulation of snow in the state.* *Changes in atmospheric circulation patterns associated with climate change can influence the tracks of winter storms. This could lead to a shift in the amounts of heavy snowfall, ice, and other winter weather hazards in Rhode Island* (RIEMA 2024). The frequency of extreme snowstorms in the eastern two-thirds of the contiguous United States has increased over the past century (NCEI 2016). It is possible that the frequency of Snow and Ice Storms could change in the future due to climate change.
	Changes in population patterns	It is unlikely that future snow storms or ice storms will cause changes in population patterns in Coventry.
	Changes in land use development	It is unlikely that future snow storms or ice storms will cause changes in land use development in Coventry. As the extent and probability of future events is projected increase, new areas of the Town are likely to need to be reserved for snow plow storage areas.

3.3.7 Brushfire

3.3.7.1 Description

Brushfires (smaller versions of wildfires) are fueled by natural cover, including native and non-native species of trees, brush and grasses, and crops along with weather conditions and topography. While available fuel, topography, and weather provide the conditions that allow fires to spread, most fires are caused by people through criminal or accidental misuse of fire.

Brushfires pose serious threats to human safety and property in rural and suburban areas. They can destroy crops, timber resources, recreation areas, and habitat for wildlife. Wildfires are commonly perceived as hazards in the western part of the country; however, brushfires are a growing problem in the wildland/urban interface of the eastern United States, including Rhode Island.

Brushfires are dependent upon the quantity and quality of available fuels. Fuel quantity is the mass per unit area. Fuel quality is determined by a number of factors, including fuel density, chemistry, and arrangement. Arrangement influences the availability of oxygen. Another important aspect of fuel quality is the total surface exposed to heat and air. Fuels with large area-to-volume ratios, such as grasses, leaves, bark, and twigs are easily ignited when dry.

Climatic and meteorological conditions that influence wildfires include solar insulation, atmospheric humidity, and precipitation, all of which determine the moisture content of wood and leaf litter. Dry spells, heat, low humidity, and wind increase the susceptibility of vegetation to fire. In Rhode Island, common factors leading to large fires include short-term drought, humidity below 20%, and fuel type.

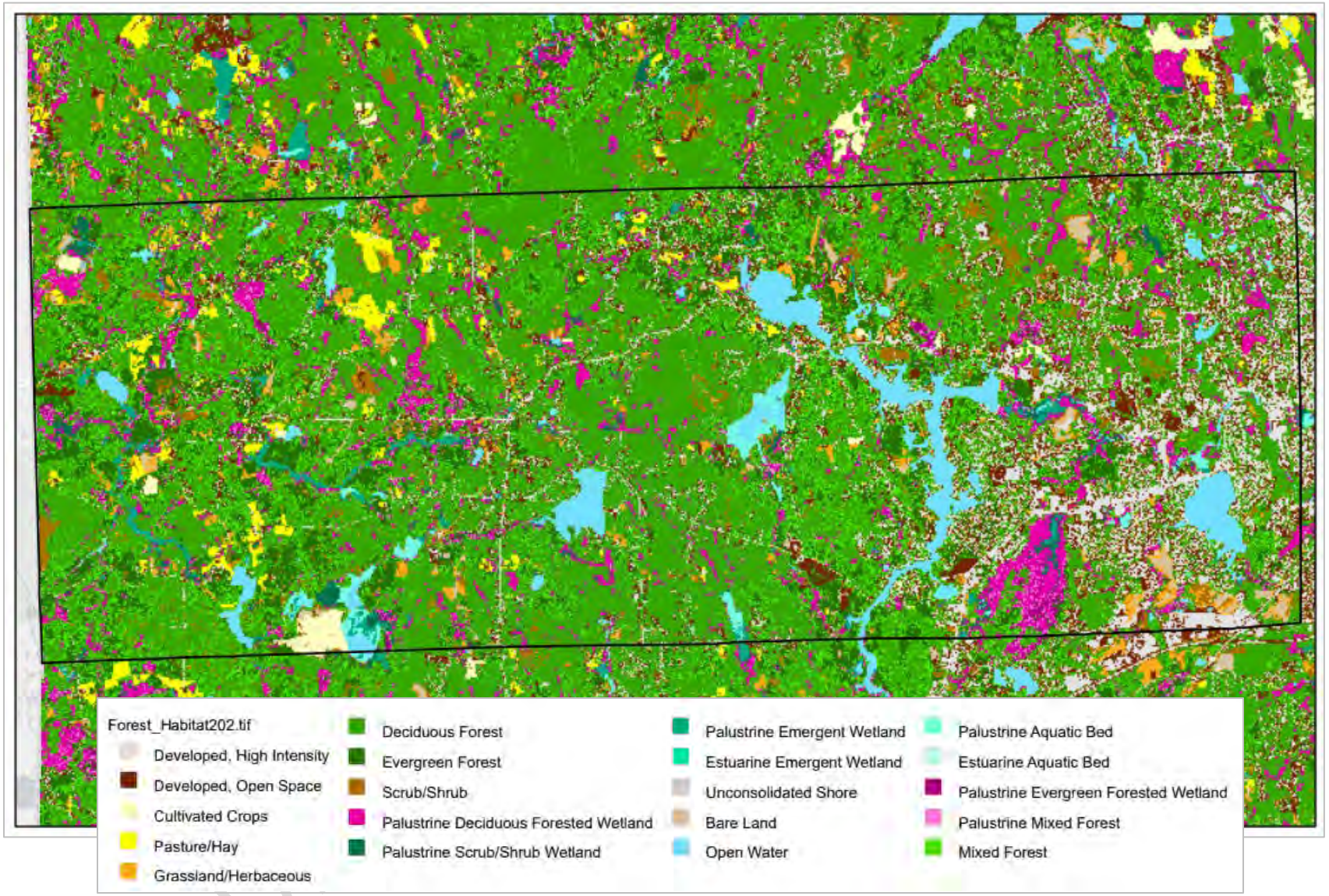
Various natural and human agents can be responsible for igniting wildfires. Natural agents include lightning, sparks generated by rocks rolling down a slope, friction produced by branches rubbing together in the wind, and spontaneous combustion.

Human-caused wildfires are typically worse than those caused by natural agents. Arson and accidental fires usually start along roads, trails, streams, or at dwellings that are generally on lower slopes or bottoms of hills and valleys. Nurtured by updrafts, these fires can spread quickly uphill. Arson fires are often set deliberately at times when factors such as wind, temperature, and dryness contribute to the fires' spread.

3.3.7.2 Location

The forested areas of Coventry are at the highest risk of fire (Figure 21).

Areas with downed and dead trees are more susceptible to catching fire. Invasive species, such as the gypsy moth caterpillar, are present in Coventry, which have damaged forests in much of New England. They hatch in May, and pupate in late June. In that short time span, the caterpillar feeds on the leaves of deciduous trees. Beginning in 2016, they caused noticeable change in the Northeastern United States.



Source: RIGIS 2024- Forest Habitat (2020)

Figure 21- Forested Areas in Coventry

3.3.7.3 Extent

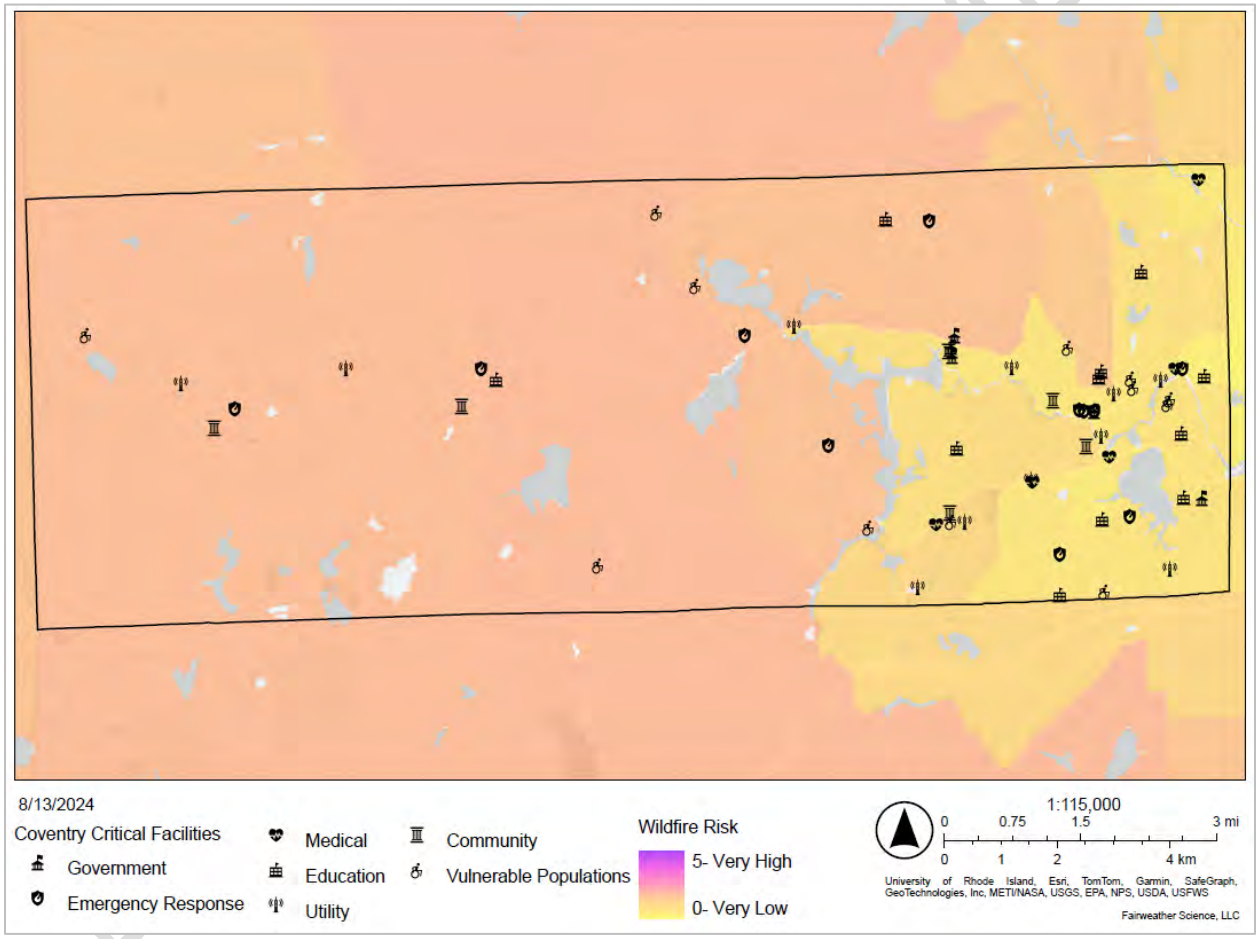
Annually in Coventry, roughly 2-3 acres are burned in the spring and less than 1 acre burns in the fall due to brushfires.

RIEMA states that Coventry has the following planning significance related to wildfire:

Jurisdiction	Wildfire NRI	Wildfire EAL
Coventry	Relatively Low	Relatively Low

Source: RIEMA 2024 NRI: National Risk Index EAL: Expected Annual Loss

Figure 22 shows Coventry's relative wildfire risk. The peach colored regions in the western portion of the Town have a risk potential score of 1.66, indicating a low risk. The yellow colored regions in the eastern portion of the Town have a risk potential score of 0.59, indicating a very low risk.



ArcGIS Layer: USA Wildfire Hazard Potential with Demographics

Figure 22- Coventry Wildfire Risk

Based on the extent of past events and the criteria identified in Table 7, the extent of brushfires in Coventry is considered **Limited**, with potential for some injuries; short shutdown of some critical infrastructure and facilities; fewer than 10% of residential and commercial structures damaged; and a small number of local operations impacted for short amounts of time.

3.3.7.4 History

A catastrophic fire in the summer of 1942 burned close to 10,000 acres in the Western Coventry District between Hopkins Hollow Road and Victory Highway.

Since the 2018 HMP, there have been no severe brushfires in Coventry.

3.3.7.5 Impact

Individual buildings may be more or less vulnerable to damage from wildfire based on factors such as the clear distance around the structure and the structure's construction materials. Brushfire primarily impacts timber and forest ecosystems, although the threat to nearby buildings is always present. Farmland and animals may also be affected.

Additionally, fires require essential resources, like a fire department, to put out, which can be costly for a community.

3.3.7.6 Probability of Future Occurrence

Based on previous occurrences and the criteria identified in Table 8, it is **Possible** that Coventry will experience a brushfire event in the next year; there is between 1-49.9% annual probability of occurring.

3.3.7.7 Future Conditions Including Climate Change

Changes in precipitation patterns may shorten the dry periods that produce ideal conditions for brushfires. However, periods of drought may be more intense, increasing the fire hazard during the summer.

Nature of the hazard	Climate change is not likely to influence the nature of future brushfires in Coventry.
Location	Climate change is not likely to influence the location of future brushfires in Coventry. The entire Planning Area is susceptible to impacts from brushfires.
Extent	Table 24 shows Coventry's historical and future projections for wildfires by estimating the Town's Fire Weather Index (FWI). The Fire Weather Index (FWI) estimates weather-related wildfire danger using daily readings of weather conditions that influence the spread of wildfires, including the dryness of fuel sources and high winds. Higher FWI values represent greater danger of wildfires due to weather conditions; the index does not account for land cover or potential ignition sources. FWI values signal different levels of relative fire danger across regions. Values above 25 typically represent a high level of danger in the northern regions.

Table 24- ClimRR Climate Projection Report- Wildfire

Wildfire	Historical	Mid-Century	End-of-Century
ANNUAL			
Fire Weather Index	8.69	8.95	9.19
Fire Weather Index Class	Low	Low	Medium
AUTUMN			
Fire Weather Index	8.35	9.33	9.09
Fire Weather Index Class	Low	Medium	Medium
WINTER			
Fire Weather Index	0.81	0.73	1.35
Fire Weather Index Class	Low	Low	Low
SPRING			
Fire Weather Index	7.67	7.78	8.07
Fire Weather Index Class	Low	Low	Low
SUMMER			
Fire Weather Index	9.61	9.13	9.47
Fire Weather Index Class	Medium	Medium	Medium

Source: Climate Risk and Resilience Portal (ClimRR) 2024

Summer FWI Analysis: The historical average FWI value in summer is 7.16. At mid-century under RCP 8.5, the summer FWI value will change to 6.58, representing a change of -0.59 and a percentage change of -8.19%. By end-of-century, the summer FWI value is projected to be 7.62, representing a change of +0.45 and a percent change of +6.34%.

Autumn FWI Analysis: The historical average FWI value in autumn is 6.11. At mid-century under RCP 8.5, the summer FWI value will change to 6.31, representing a change of +0.20 and a percentage change of 3.29%. By end-of-century, the autumn FWI value is projected to be 6.85, representing a change of +0.74 and a percent change of +12.11%.

Relative Fire Danger: FWI classes show fire weather-related danger relative to nationwide patterns and are based on 95th percentile FWI values. Coventry's historical FWI class is Low and its mid-century RCP8.5 class is Low. By end-of-century, the FWI class will be **Medium**.

It is possible that climate change will influence the extent of brushfires in the future.

Impact	As Coventry's overall fire danger is projected to increase, potential impacts to the community will increase. These impacts are likely to include damage to critical facilities/ infrastructure, historical facilities, homes, and the overall safety of Town residents.

Probability of Future Events	Climate change is likely to increase the probability of future brushfires in Coventry as changes in climate create warmer, drier conditions, leading to longer and more active fire seasons.
Changes in population patterns	It is possible that future brushfires are likely to cause changes in population patterns if portions of the Town that historically were not affected by brushfires become affected, causing relocation of homes and residents.
Changes in land use development	It is possible that future brushfires are likely to cause changes in land use development if portions of the Town are burned due to a fire.

3.3.8 Drought

3.3.8.1 Description

Drought is characterized as a continuous period of time in which rainfall is significantly below the normal for a particular area over a multi-year period. The American Meteorology Society defines drought as a period of abnormally dry weather sufficiently long enough to cause a serious hydrological imbalance.

There are cases when drought develops relatively quickly and lasts a very short period of time, exacerbated by extreme heat and/or wind, and there are other cases when drought spans multiple years, or even decades (RIEMA 2024). While droughts typically cause very little structural damage, they can have profound economic, environmental, and social impacts.

There are four different ways that a drought can be categorized:

- Agricultural: When the amount of moisture in the soil no longer meets the needs of previously grown crops.
- Hydrological: When surface and subsurface water levels are significantly below their normal levels.
- Meteorological: When there is a significant departure from the normal levels of precipitation.
- Socio-Economic: When the water deficiency begins to significantly affect the population.

3.3.8.2 Location

All of Coventry is susceptible to droughts.

3.3.8.3 Extent

The United States Drought Monitor (USDM) tracks drought conditions in Rhode Island and in the rest of the nation. They create maps based on climate data, hydrologic and soil conditions, as well as reported impacts and observations from over 350 contributors nationwide. Table 25 describes the USDM's drought classification system as well as possible impacts from each category.

Table 25- USDM Classifications of Drought Conditions

Category	Description	Possible Impacts
D0	Abnormally Dry	Going into drought: • short-term dryness slowing planting, growth of crops or pastures Coming out of drought: • some lingering water deficits • pastures or crops not fully recovered
D1	Moderate Drought	• Some damage to crops, pastures • Streams, reservoirs, or wells low, some water shortages developing or imminent • Voluntary water-use restrictions requested
D2	Severe Drought	• Crop or pasture losses likely • Water shortages common • Water restrictions imposed
D3	Extreme Drought	• Major crop/pasture losses • Widespread water shortages or restrictions
D4	Exceptional Drought	• Exceptional and widespread crop/pasture losses • Shortages of water in reservoirs, streams, and wells creating water emergencies

RIEMA states that Coventry has the following planning significance related to drought:

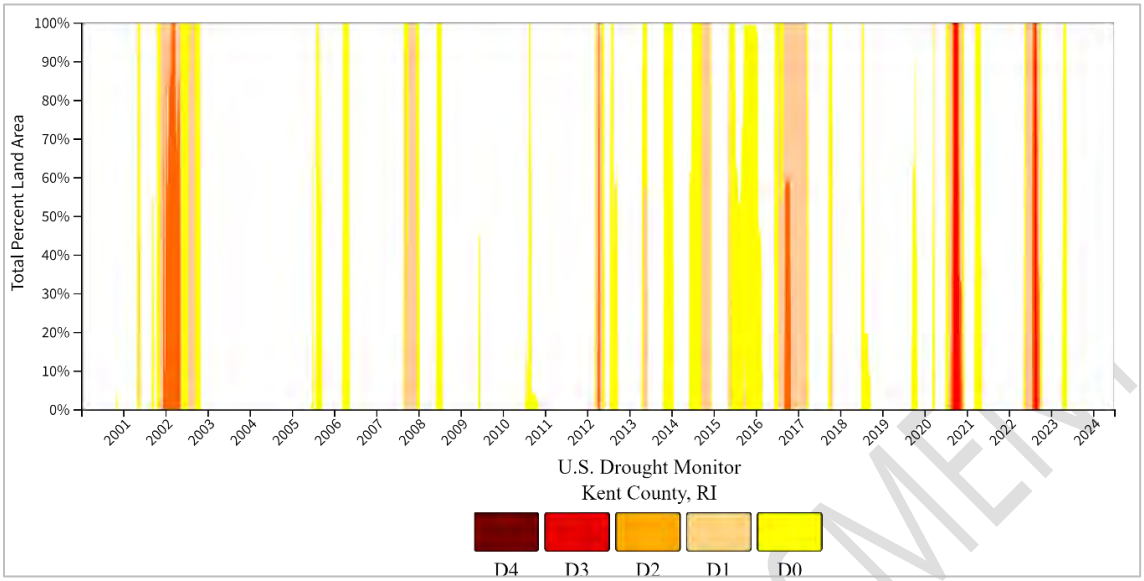
Jurisdiction	Drought NRI	Drought EAL
Coventry	Very Low	Very Low

Source: RIEMA 2024 NRI: National Risk Index EAL: Expected Annual Loss

Based on the extent of past events and the criteria identified in Table 7, the extent of droughts in Coventry is considered **Limited**, with potential for some injuries; short shutdown of some critical infrastructure and facilities; fewer than 10% of residential and commercial structures damaged; and a small number of local operations impacted for short amounts of time.

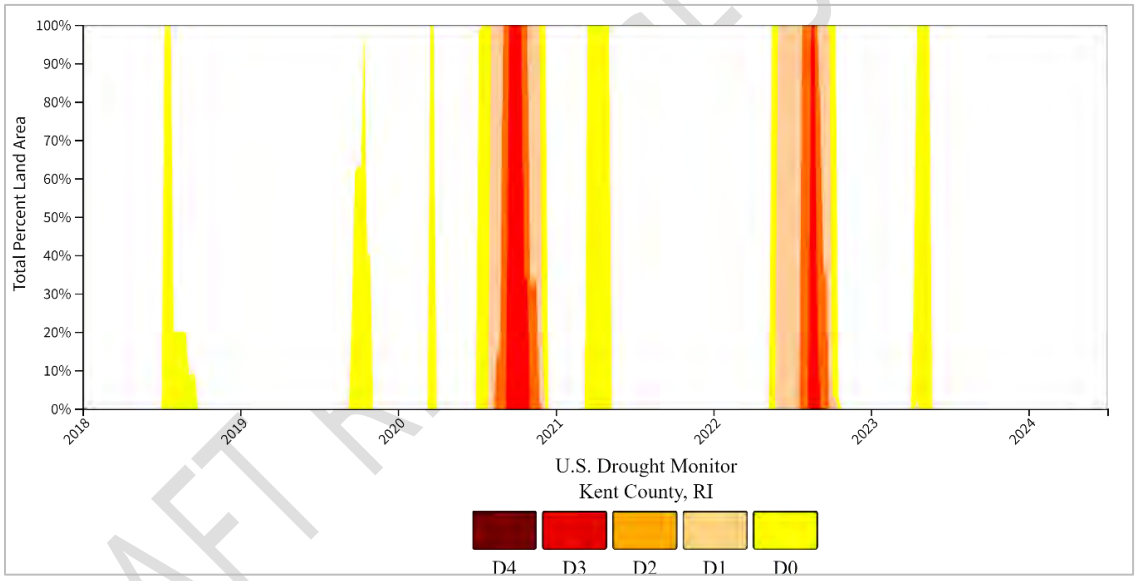
3.3.8.4 History

Figure 23 shows historical drought conditions for Kent County from 2000 through June 2024. Since the 2018 HMP, Kent County has been through periods of drought ranging from D0 (Abnormally Dry) to D3 (Extreme Drought) (Figure 24).



Source: NOAA NIDIS 2024

Figure 23- Historical Drought Conditions for Kent County (2000 - June 2024)



Source: NOAA NIDIS 2024

Figure 24- Historical Drought Conditions for Kent County (2018 - June 2024)

Table 26 further breaks down the weekly percentage that Kent County was in one of the USDM categories from 2000-2023.

Table 26- Weekly Percentage of Kent County in USDM Categories (2000-2023)

County	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Kent	74.7%	25.2%	11.7%	3.1%	0.8%	0.0%

Source: RIEMA 2024

Additionally, The Secretary of Agriculture is authorized to designate counties as disaster areas to make emergency loans available to producers suffering losses in those counties and in counties that are

contiguous to a designated county. United States Department of Agriculture Secretarial disaster designations must be requested of the Secretary of Agriculture by a governor or the governor's authorized representative, and there is an expedited process for drought (RIEMA 2024).

Since 2012, there have been 3 Secretarial Drought Disaster Declarations issued for Kent County (2016, 2020, and 2022) (RIEMA 2024).

3.3.8.5 Impact

Periods of drought can have significant environmental, agricultural, health, economic, and social consequences. The effects vary depending upon vulnerability and regional characteristics. Droughts can also reduce water quality through a decreased ability for natural rivers and streams to dilute pollutants and increase contamination. The most common effects are diminished crop yield, increased erosion, dust storms, ecosystem damage, reduced electricity production due to reduced flow through hydroelectric dams, shortage of water for industrial production, and increased risk of wildland fires (RIEMA 2024).

The main impact of meteorological drought is periods of very high fire danger. In addition, small pond levels are reduced, thereby impacting private wells.

Drought conditions have been known to trigger the rapid increase of the gypsy moth populations in the region. The extended period of dry weather (specifically in May and June) slows the fungus that usually keeps the gypsy moth caterpillars at bay. Denuded trees can have cascading effects on the local ecosystem.

3.3.8.6 Probability of Future Occurrence

For the 2024 State of Rhode Island HMP, RIEMA reviewed historical data from the U.S. Drought Monitor weekly reports for each Rhode Island County from 2000 through 2023 (1,233 weeks) and created a weekly average that indicates the percentage time in each Drought Monitor category for the State. RIEMA used this average to extrapolate the potential likelihood of future drought conditions (Table 27).

Table 27- Estimated Weekly Probability of Rhode Island Being in U.S. Drought Monitor Category

None	D0-D4	D1-D4	D2-D4	D3-D4	D4
74.2%	25.8%	11.8%	3.4%	0.8%	0.0%

Source: RIEMA 2024

Based on previous occurrences and the criteria identified in Table 8, it is **Likely** that Kent County, including Coventry, will experience a drought event, of any magnitude, in the calendar year; there is a between 50-89.9% annual probability of occurring.

3.3.8.7 Future Conditions Including Climate Change

Nature of the hazard	Climate change interacts with droughts in many ways. Some regions are experiencing warmer, drier conditions than they have in the past, leading to less rainfall (meteorological drought) or snowpack (snow drought). Over time, this can cause water sources like lakes, streams, and underground aquifers to dry up (hydrological drought). This, in turn, can lead to water shortages in human communities (socioeconomic drought) and agricultural systems (agricultural drought). It can also damage plant and animal communities in the region (ecological drought) (USGS 2022).
Location	Climate change is not likely to influence the location of future droughts in Coventry.
Extent	Climate change is likely to increase the intensity and length of droughts. Climate change

	exacerbates droughts by making them more frequent, longer, and more severe.
Impact	As droughts are projected to become more frequent, longer, and more severe, impacts to Coventry will increase. Future impacts are likely to include water shortages, impacts to agriculture, plants, and animals, and overall human health.
Probability of Future Events	Climate change is highly likely to exacerbate droughts by making them more frequent, longer, and more severe.
Changes in population patterns	It is unlikely that future droughts will cause changes in population patterns in Coventry.
Changes in land use development	It is possible that future droughts will cause changes in land use development in Coventry. Areas historically not suitable for development may change in the future opening up developable areas.

NOAA's State Climate Summary 2022 for Rhode Island suggests that annual average precipitation, as well as extreme precipitation events, are projected to increase for Rhode Island. Although increased precipitation is projected, naturally occurring droughts are projected to be more intense because higher temperatures will increase evaporation rates (RIEMA 2024).

Additionally, higher temperatures associated with climate change can increase the rate of evaporation from soil, water bodies, and vegetation. This can contribute to soil moisture depletion and more rapid drying of surface water sources during dry periods (RIEMA 2024).

3.3.9 Extreme Temperatures

3.3.9.1 Description

Extreme temperature events occur when climate conditions produce temperatures well outside of the predicted norm. These extremes can have severe impacts on human health and mortality, natural ecosystems, agriculture, and other economic sectors (RIEMA 2024).

Extreme heat is defined as temperatures that hover 10 degrees or more above the average high temperature for the region and last for several weeks. Ambient air temperature is one component of heat conditions, with relative humidity being the other. Humid or muggy conditions, which add to the discomfort of high temperatures, occur when an area of high atmospheric pressure traps moisture laden air near the ground (RIEMA 2024).

Although no specific definition exists for extreme cold, an extreme cold event can generally be defined as temperatures at or below freezing for an extended period of time. Extreme cold events are usually part of winter storm events but can occur during anytime of the year and can have devastating effects on agricultural production (RIEMA 2024).

3.3.9.2 Location

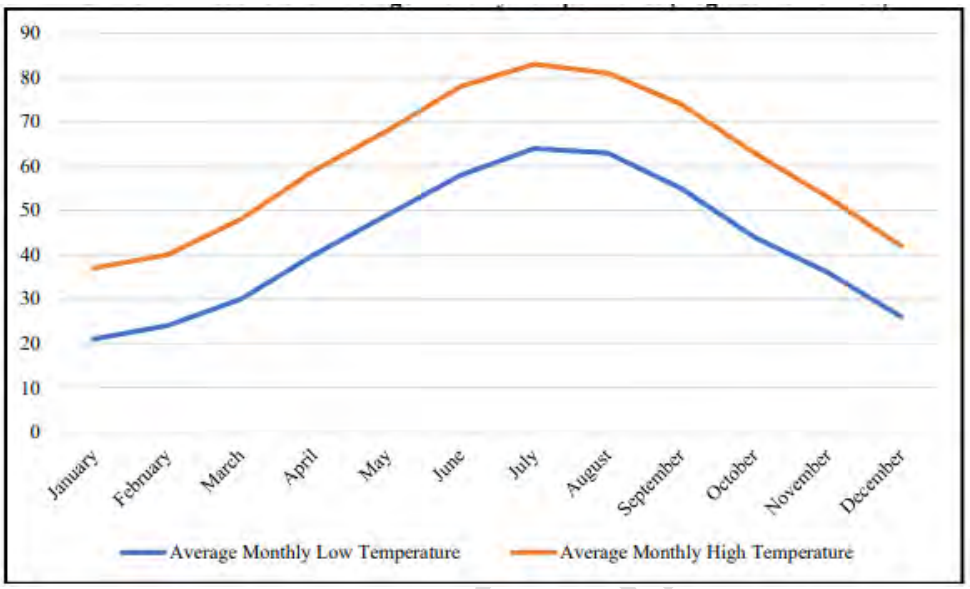
An extreme heat or cold event would be a regional issue affecting Coventry and significant portions of Southern New England. Extreme temperatures could have a serious impact on private and public structures, as well as the general population throughout Coventry. Those most at risk to extreme temperatures are the elderly and those who work outside. Coventry has a relatively large elderly population.

3.3.9.3 Extent

In Rhode Island, extreme cold usually involves temperatures below 0^{o}F. The National Weather Service (NWS) issues extreme (or excessive) heat warnings when the maximum expected heat index is expected

to be 105° F or higher for at least 2 consecutive days and night time air temperatures are not expected to fall below 75°. In the northeast, these criteria are generally modified to a heat index of 92° or higher for 2 consecutive days.

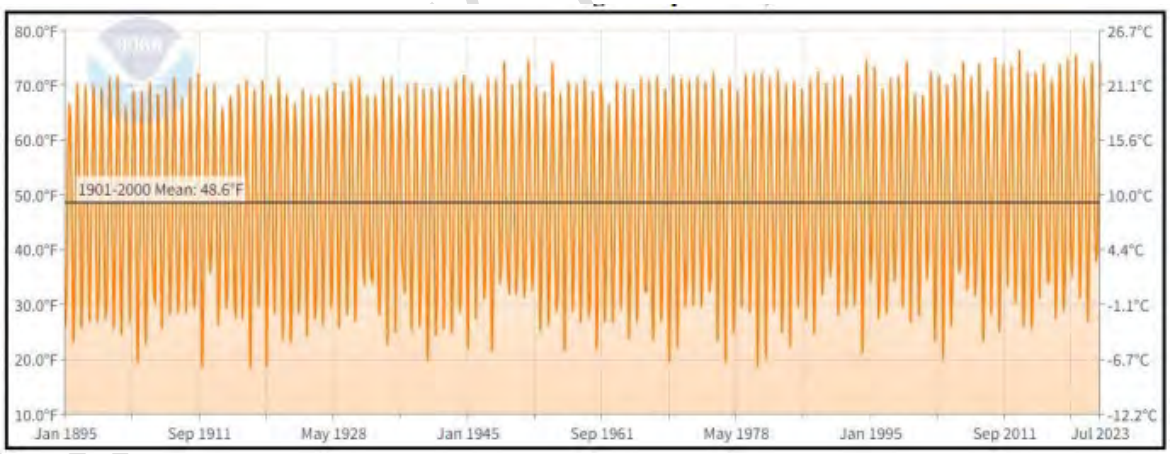
Figure 25 details monthly temperature averages for Rhode Island:



Source: NOAA per RIEMA 2024

Figure 25- Rhode Island Average Monthly Temperatures (°F)

Figure 26 details the average temperature for Rhode Island from 1895 to 2023.



Source: NCEI 2023

Figure 26- Rhode Island Average Temperature (1895-2023)

RIEMA states that Coventry has the following planning significance related to extreme temperatures:

Jurisdiction	Heatwave NRI	Heatwave EAL	Cold Wave NRI	Cold Wave EAL
Coventry	Relatively Low	Relatively Low	Relatively Low	Relatively Low

Source: RIEMA 2024 NRI: National Risk Index EAL: Expected Annual Loss

Based on the extent of past events and the criteria identified in Table 7, the extent of extreme

temperatures in Coventry is considered **Limited**, with potential for some injuries; short shutdown of some critical infrastructure and facilities; fewer than 10% of residential and commercial structures damaged; and a small number of local operations impacted for short amounts of time.

3.3.9.4 History

Temperatures are recorded by NOAA at the T.F. Green International Airport in Warwick, RI (7 miles east of Coventry). This data is the most accurate for recording weather in and around Coventry. Table 28 summarizes extreme temperature events in Kent County.

Since the 2018 HMP, there have been 0 extreme temperature events recorded in Kent County.

Table 28- History of Extreme Temperatures in Kent County

Date	Event Type	Event Details
1/3/1998	Heat	The maximum temperature at T.F. Green Airport in Warwick reached a balmy, record-setting 62 degrees. The previous record was 58 degrees set on this date in 1913.
3/31/1998	Heat	On March 27th, the high temperature at T.F. Green Airport in Warwick reached 81 degrees, breaking the old record for the date of 77 degrees set in 1945. On March 28th, the temperature rocketed to 81 degrees at 11:40 AM, breaking the old record for the date set in 1989. The high temperature for the day was 83 degrees, thereby establishing the new record high temperature for March 28th. On March 31st, the temperature at T.F. Green Airport in Warwick reached 85 degrees at 1:50 PM, breaking the previous record for the date of 75 degrees set in 1981. The warmest temperature ever recorded in the month of March is 90 degrees on March 29, 1945, however.
3/18/1999	Heat	The high temperature of 71 degrees at T.F. Green State Airport in West Warwick broke the previous record high for the date of 69 degrees, which was set in 1945.
5/9/2000	Heat	Temperature: 91°. 3rd day in a row of high temps exceeding 90 degrees at nearby TF Green airport. Earliest heatwave on record since 1904.
5/3/2001	Heat	Temperature: 91° at nearby T.F. Green airport.
5/4/2001	Heat	Temperature: 92°. 3rd day of temperatures reaching 90 degrees or higher, making it the NEW earliest heat wave on record in greater Providence.
5/12/2001	Heat	Temperature: 90° at nearby T.F. Green airport.
7/6/2010	Heat	Heat index 105-106° at nearby T.F. Green airport.
7/22/2011	Heat	Heat index 105-106° at nearby T.F. Green airport.
2/16/2015	Wind Chill	The Automated Surface Observation Station at T.F. Green Airport in Warwick, RI (KPVD) recorded wind chills as low as 26 below zero.
2/14/2016	Wind Chill	Wind chills as low as 32 below zero were reported at TF Green Airport in Warwick.

Source: NOAA Storm Events Database- Storm Prediction Center Product (NWS 2024a)

3.3.9.5 Impact

Personal exposure to dangerous heat conditions may lead to heat cramps, heat exhaustion, and heat stroke. These are especially important to monitor in children, and vulnerable populations that are not able to move to cooler conditions. Agriculture and animals are also stressed by extremely high temperatures.

Extreme cold conditions may occur during, after, or without any connection to a winter storm. Exposure

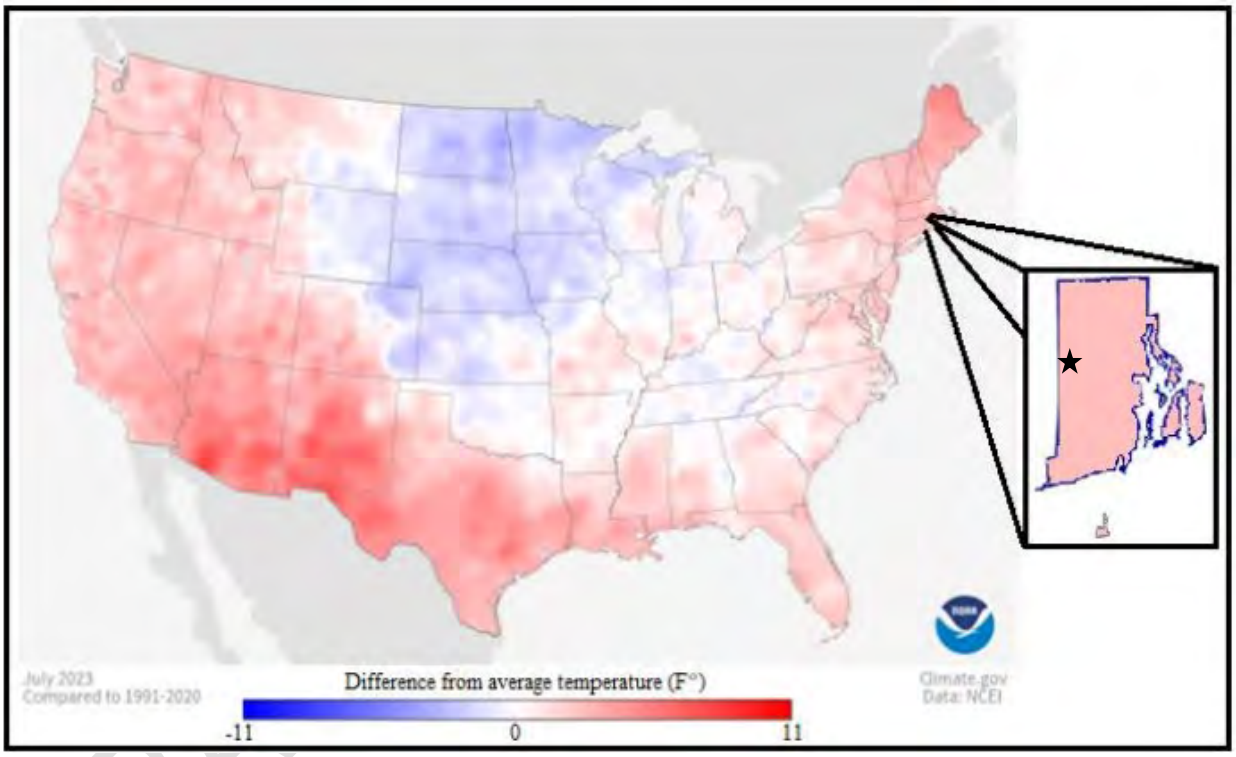
to extreme cold can lead to hypothermia and frostbite. Agriculture and animals are also stressed by extreme cold temperatures.

The Centers for Disease Control and Prevention (CDC) identifies the following six groups as being especially vulnerable to extreme temperatures:

- Older Adults (aged 65)
- Infants and Children
- Individuals with Chronic Conditions
- Low-income Individuals
- Athletes
- Outdoor workers

3.3.9.6 Probability of Future Occurrence

Predicting the probability of extreme temperature occurrences is tremendously challenging due to the large number of factors involved (RIEMA 2024). Available data suggests that both the average high temperatures and the record high temperature will likely increase over the coming years (Figure 27) (RIEMA 2024). Rhode Island falls in the +3-5^{o} above average range.



Source: NOAA per RIEMA 2024

Figure 27- Rhode Island Temperature Difference from Average (1990-2020)

Based on previous occurrences and the criteria identified in Table 8, it is **Likely** that Coventry will experience extreme temperatures in the calendar year; there is a between 50-89.9% annual probability of occurring.

3.3.9.7 Future Conditions Including Climate Change

Nature of the hazard	Climate change is not likely to influence the nature of future extreme temperature events in Coventry.
Location	Extreme temperatures are a regional hazard, and climate change is not likely to alter the

	location of these events in the future.
Extent	Table 29 shows Coventry's historical and future projections for average temperatures by season under different climate change models. **Table 29- ClimRR Climate Projection Report- Temperature**

Temperature	Hist.	Mid-Century RCP 4.5	Mid-Century RCP 8.5	End-Of-Century RCP 4.5	End-Of-Century RCP 8.5
ANNUAL					
Heating Degree Days	6,478.55	-	5,637.06	-	-
Cooling Degree Days	494.56	-	819.64	-	-
Maximum Avg Temperature (Degrees F)	54.37	58.98	57.51	60.64	64.09
Minimum Avg Temperature (Degrees F)	40.11	44.7	43.92	46.6	50.82
AUTUMN					
Maximum Avg Temperature (Degrees F)	60.07	-	63.81	-	68.83
Minimum Avg Temperature (Degrees F)	45.37	-	49.17	-	54.51
WINTER					
Maximum Avg Temperature (Degrees F)	37.85	-	41.34	-	45.95
Minimum Avg Temperature (Degrees F)	23.54	-	27.68	-	33.42
SPRING					
Maximum Avg Temperature (Degrees F)	55.58	-	60.21	-	63.98
Minimum Avg Temperature (Degrees F)	40.45	-	45.08	-	49.4
SUMMER					
Maximum Avg Temperature (Degrees F)	74.8	-	79.19	-	83.52
Minimum Avg Temperature (Degrees F)	60.36	-	64.87	-	70.09

Source: Climate Risk and Resilience Portal (ClimRR) 2024

Historical Temperature Analysis: The historical annual maximum temperature is 54.37°F. Under RCP 4.5 the annual maximum temperature at mid-century is 58.98°F which represents a +4.61°F change from the baseline. Under RCP 8.5 the annual maximum temperature at mid-century is 57.51°F which represents a +3.14°F change from the baseline.

Mid-Century Temperature Analysis: The historical annual minimum temperature is 40.11°F. Under RCP 4.5 the annual minimum temperature at mid-century is 44.70°F which

represents a +4.59°F change from the baseline. Under RCP 8.5 the annual minimum temperature at mid-century is 43.92 °F which represents a +3.81°F change from the baseline.

End-of-Century Temperature Analysis: The historical annual minimum temperature is 40.11°F. Under RCP 4.5 the annual minimum temperature at end-of-century is 46.60°F which represents a +6.48°F change from the baseline. Under RCP 8.5 the annual minimum temperature at end-of-century is 50.82°F which represents a +10.70°F change from the baseline.

Overall Annual Temperature Analysis: Under RCP 4.5 the annual maximum temperature at end-of-century is 60.64°F which represents a +6.27°F change from the baseline. Under RCP 8.5 the annual maximum temperature at end-of-century is 64.09°F which represents a +9.73°F change from the baseline.

Table 30 shows Coventry's historical and future projections for heat index. Heat index is a measure of how hot weather feels to humans when factoring in both relative humidity and the actual temperature. Heat index is an important gauge of heat-related risks. Readings above 105°F typically represent dangerous conditions, with readings above 125°F being extremely dangerous to humans.

Table 30- ClimRR Climate Projection Report- Heat Index

Heat_Index	Historical	Mid-Century	End-of-Century
SUMMER			
Daily Max Heat Index (Degrees F)	77.3	81.69	89.02
Seasonal Max Heat Index (Degrees F)	90.81	102.17	116.61
Days with Max Heat Index Over 95 (Days)	0.37	2.5	21.93
Days with Max Heat Index Over 105 (Days)	0	0.47	3.83
Days with Max Heat Index Over 115 (Days)	0	0.37	0.9
Days with Max Heat Index Over 125 (Days)	0	0.23	0.37

Source: Climate Risk and Resilience Portal (ClimRR) 2024

Mid-Century Heat Analysis: The average daily maximum heat index in summer over the historical period is 77.30°F. Under RCP 8.5, the average daily max heat index at mid-century is 81.69°F, which represents a +4.39°F change from the baseline. The single highest heat index measured in Summer months is 90.81°F in the historical period and 102.17°F at mid-century (RCP8.5), representing an increase of +11.36°F.

Historically, the number of summer days with a heat index above 95°F was 0.37 days. By mid-century under RCP8.5, 2.50 summer days are projected to have a heat index above 95°F, representing an increase of +2.13. Summer days with heat index above 115°F have been rarer, with 0.00 such days in the historical period and a projected 0.37 by mid-century (RCP8.5), representing a change of +0.37 days.

End-Century Heat Analysis: The average daily maximum heat index in summer over the

	historical period is 77.30°F. Under RCP 8.5, the average daily max heat index at end-century is 89.02°F, which represents a +11.72°F change from the baseline. The single highest heat index measured in Summer months is 90.81°F in the historical period and 116.61°F at end-century (RCP8.5), representing an increase of +25.80°F. Historically, the number of summer days with a heat index above 95°F was 0.37 days By end-century under RCP8.5, 21.93 summer days are projected to have a heat index above 95°F, representing an increase of +21.57. Summer days with heat index above 115°F have been rarer, with 0.00 such days in the historical period and a projected 0.90 by end-century (RCP8.5), representing a change of +0.90 days. Climate change will likely influence the extent of extreme temperatures.
Impact	As global temperatures continue to rise, Coventry will likely experience hotter summer/fall seasons and less cold winter/spring seasons. Temperature extremes most directly affect health by compromising the body's ability to regulate its internal temperature. Loss of internal temperature control can result in various illnesses, including heat cramps, heat exhaustion, heatstroke, and hyperthermia from extreme heat events. Temperature extremes related to heat can also worsen chronic conditions such as cardiovascular disease, respiratory disease, cerebrovascular disease, and diabetes-related conditions. Elderly, children, and those who work outside are most susceptible to heat-related impacts. Extreme heat events are likely to also impact livestock, power grid infrastructure, and food production.
Probability of Future Events	As global temperatures continue to rise, it is likely that Coventry will experience more frequent occurrences of extreme heat during the summer, but less extreme cold events during the winter.
Changes in population patterns	It is possible that future extreme temperature events will cause changes in population patterns in Coventry as the aging population of the Town's residents may relocate to other regions of the country to get away from these extreme temperature events.
Changes in land use development	It is unlikely that future extreme temperature events will cause changes in land use development in Coventry.

The 2024 State of Rhode Island HMP states:

Temperatures in Rhode Island have risen by 4° F since the early 1900s, with the number of hot days above the long-term average since the 1990s. Additionally, the greatest number of warm nights has been recorded over the 2015–2020 period. Very cold days have been mostly below average since the 1980s (RIEMA 2024).

3.3.10 Tornadoes

3.3.10.1 Description

A tornado is a violent, dangerous, rotating column of air that is in contact with both the surface of the earth and a cumulonimbus cloud or, in rare cases, the base of a cumulus cloud. Tornadoes come in many shapes and sizes but are typically in the form of a visible condensation funnel, whose narrow end touches the earth and is often encircled by a cloud of debris and dust. Tornadoes are produced when cool air overrides a layer of warm air, forcing the warm air to rise rapidly.

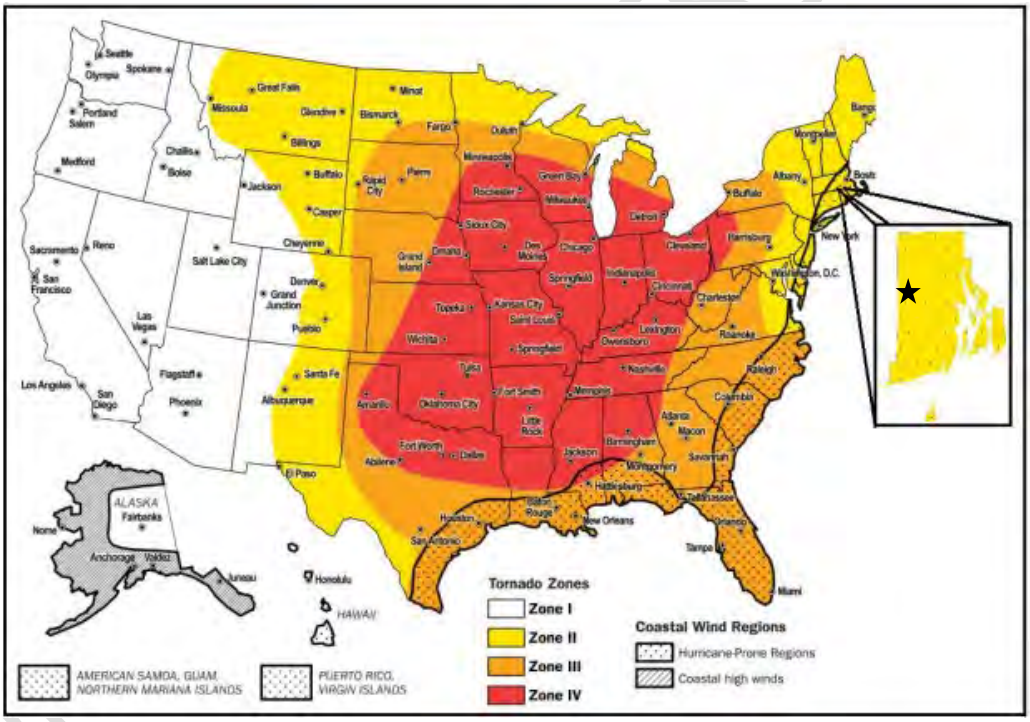
The damage from a tornado is a result of the high wind velocity and wind-blown debris. Tornado season is generally March through August, although tornadoes can occur at any time of year. Over 80% of all tornadoes strike between noon and midnight. During an average year, about 1,000 tornadoes are reported across the United States, resulting in 80 deaths and over 1,500 injuries. The most violent tornadoes are capable of tremendous destruction with wind speeds of 250 mph or more. Damage paths can be in excess of one-mile-wide and 50 miles long.

Figure 28- Tornado Watch Issued for Rhode Island

3.3.10.2 Location

All of Coventry is susceptible to tornadoes.

Figure 29 shows the nationwide tornado/wind zones. Rhode Island is located in Zone 2, which equates to ~150 mph winds.



*Tornado Zones- Zone I: 130 mph, Zone II: 150 mph, Zone III: 200 mph, Zone IV: 250 mph

Source: FEMA per RIEMA 2024

Figure 29- Nationwide Tornado Zones

3.3.10.3 Extent

Tornadoes are categorized according to the damage they produce using the Enhanced Fujita Scale (EF Scale), which is shown in Table 31. An F0 tornado causes the least amount of damage, while an F5 tornado causes the most amount of damage. It is important to note that the size of a tornado is not necessarily an indication of its intensity.

Table 31- Enhanced Fujita Scale

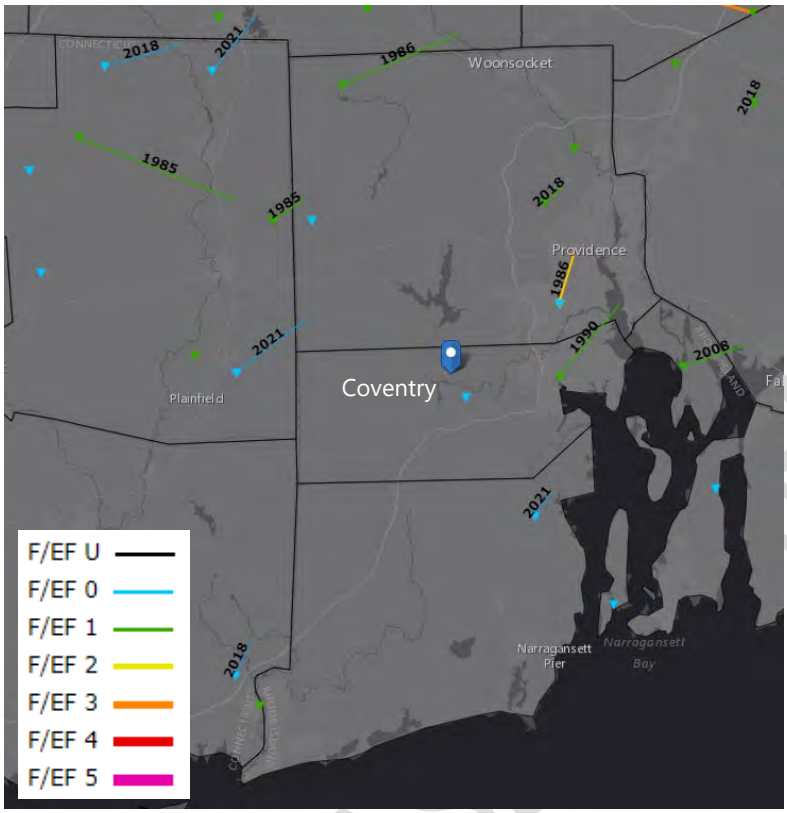
EF Number	3 Second Gust	Damage Scale
0	65-85 mph	**Light damage.** Some damage to chimneys; branches broken off trees; shallow-rooted trees pushed over; sign boards damaged.
1	86-110 mph	**Moderate damage.** Peels surface off roofs; mobile homes pushed off foundations or overturned; moving autos blown off roads.
2	111-135 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.
3	136-165 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.
4	166-200 mph	**Devastating damage.** Well-constructed houses leveled; structures with weak foundations blown away some distance; cars thrown generating large missiles.
5	>200 mph	**Incredible damage**. Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 300 feet; trees debarked; incredible phenomena will occur.

Based on the extent of past events and the criteria identified in Table 7, the extent of tornadoes in Coventry is considered **Limited**, with potential for some injuries; short shutdown of some critical infrastructure and facilities; fewer than 10% of residential and commercial structures damaged; and a small number of local operations impacted for short amounts of time.

However, if a tornado were to pass directly though the Town, the impacts could be catastrophic.

3.3.10.4 History

Figure 30 shows historical tornado tracks near Coventry from 1950-2022. The triangles represent the touchdown locations of the tornado. The one tornado that touched downed in Coventry (blue triangle) occurred on August 13, 1994 and had a length of 0.5 miles and width of 50 yards. There was no damage, nor injuries or fatalities from this tornado.



Source: MRCC 2024

Figure 30- Historical Tornado Tracts in Rhode Island (1950-2022)

Rhode Island has experienced one Presidential Disaster Declaration related to tornadoes (Table 32). This Declaration was due to a series of tornadoes that occurred from September 10 to September 13, 2023 in Providence County (north of Coventry).

Since the 2018 HMP, there has been 1 Rhode Island Presidential Disaster Declaration relating to tornadoes, but Coventry was not impacted by this event.

Table 32- State of Rhode Island Presidentially Declared Disasters Relating to Tornadoes

Designation	Incident Period	Declaration Date	Incident Type
DR-4753-RI	09/10 – 09/13/2023	01/07/2024	Severe Storms, Flooding, and Tornadoes (Providence County)

Source: FEMA 2024

3.3.10.5 Impact

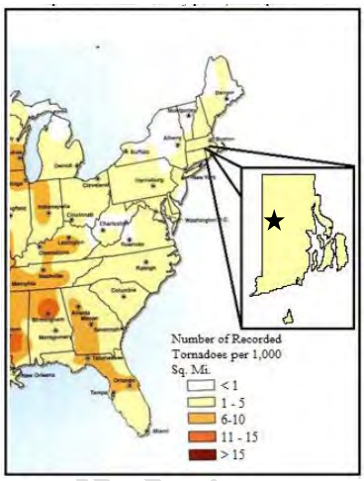
In Coventry, tornadoes could cause significant damage to structures, trees and utility lines and flying debris can cause injuries to residents. Mobile homes are generally more vulnerable to tornado damage than steel framed structures.

3.3.10.6 Probability of Future Occurrence

Predicting the probability of tornado occurrences is tremendously challenging due to the large number of factors involved and the random nature of formation. Data from the NCEI indicates that Rhode Island can expect infrequent tornado events based on the 14 statewide events recorded from 1950 to 2023. Available historical tornado data suggests that Rhode Island can expect future tornadoes to range from EF0 to EF2 on the Enhanced Fujita Scale.

Figure 31 shows Rhode Island's tornado activity per 1,000 miles. The entire state falls within the category of 1-5 tornadoes per 1,000 square miles.

Based on previous occurrences and the criteria identified in Table 8, it is **Possible** that Coventry will experience a tornado event in the next year; there is between 1-49.9% annual probability of occurring.



Source: RIEMA 2024

Figure 31- Rhode Island Tornado Activity per 1,000 Square Miles

3.3.10.7 Future Conditions Including Climate Change

The 2024 State of Rhode Island HMP states:

The relationship between climate change and tornadoes is complex, and while there is ongoing research in this area, it is not fully understood. Tornadoes are small-scale, short-lived weather phenomena that can be influenced by a variety of atmospheric factors, including temperature, humidity, wind patterns, and atmospheric instability. Climate change can influence some of these factors, which may, in turn, affect tornado activity.

Tornadoes typically form when warm, moist air near the surface clashes with cooler, drier air aloft, creating atmospheric instability. Climate change can alter temperature and humidity patterns, potentially affecting the conditions necessary for tornado formation. Additionally, climate change can lead to more extreme and variable weather patterns. While this may not necessarily increase the overall number of tornadoes, it could lead to more unpredictable and severe tornado events when they do occur. Some research suggests that climate change could lead to longer tornado seasons, with tornadoes occurring outside of their typical timeframes.

It's important to emphasize that while there may be some links between climate change and tornado activity, these links are not fully understood, and it is difficult to attribute specific tornado events to climate change. Tornadoes are influenced by a complex interplay of factors, and any changes in tornado patterns may vary by region (RIEMA 2024).

Nature of the hazard	Unlike temperature or precipitation trends, the influence of climate change on tornadoes is far more difficult to discern. Numerous complex atmospheric conditions combine to generate a tornado, and researchers are still developing tools to help discern potential human influence from natural variability. Currently, the majority of research stops short of connecting historical changes in tornado behavior to a warming climate (NOAA 2023). At this point in time, it is possible that climate change may influence the nature of future tornadoes, but additional data is needed.
Location	While the influence of climate change on tornadoes is still being researched, there is preliminary evidence to support that tornadoes are touching down in new locations. The Planning Team states that tornado watches are becoming more frequent than they have been historically. At this point in time, it is possible that climate change may influence the location of future

	tornadoes, but additional data is needed.
Extent	While the direct attribution between climate change and tornado frequency and magnitude is still being studied, there is a link between climate and tornadoes in the mid-west and Tornado Alley (Texas State 2024). There are currently no studies that discuss the extent of future tornadoes in New England. At this point in time, it is possible that climate change may influence the extent of future tornadoes, but additional data is needed.
Impact	While the full understanding of how climate change is influencing tornadoes in New England is still being researched, historical tornadoes in Coventry have not had severe impacts. If tornadoes become more frequent and more severe than historical ones, then impacts to the Town are likely to increase with increased potential for infrastructure damages and potential physical impacts to residents.
Probability of Future Events	Research suggests there is a greater risk of more off-season tornadoes in a warmer future climate. This could mean more tornadic activity at a time of year when people are least expecting it. Results are inconclusive for whether tornadoes could become more or less frequent during the traditional severe weather season (NOAA 2023). At this point in time, it is possible that climate change may influence the probability of future tornadoes, but additional data is needed.
Changes in population patterns	While the full understanding of how climate change is influencing tornadoes in New England is still being researched, historical tornadoes in Coventry have not had severe impacts. Therefore, it is not likely that future tornadoes will impact future population patterns in Coventry.
Changes in land use development	While the full understanding of how climate change is influencing tornadoes in New England is still being researched, historical tornadoes in Coventry have not had severe impacts. Therefore, it is not likely that future tornadoes will impact future land use development in Coventry.

3.3.11 Earthquake

3.3.11.1 Description

An earthquake is the result of a sudden release of energy in the Earth's crust that creates seismic waves. This sudden movement can be felt at sometimes very distant sites from the epicenter, and it usually occurs without warning. The movement can build rapidly after just a few seconds and cause significant, sometimes catastrophic, damage and severe numbers of casualties, and this often-violent motion or shaking is the most common effect of earthquakes.

The seismicity or seismic activity of an area refers to the frequency, type and size of earthquakes experienced over a period of time. Earthquakes are measured with a seismometer. The size or magnitude is recorded on a device known as a seismograph.

Despite the low probability of a high impact earthquake, physical characteristics in Rhode Island may increase earthquake vulnerability:

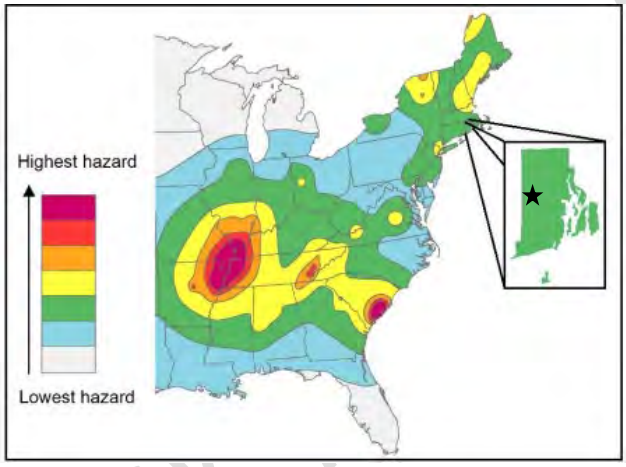
- Hard Rock: Due to the geological makeup of New England's base rock, seismic energy is conducted on a greater scale (4-10) times that of an equivalent Richter magnitude earthquake in California).
- Soft Soil: Many coastal regions of New England are made up of soft soils. These soils can magnify an earthquake as much as two times.
- Structures: The New England region, being one of the first settled areas of the United States, has an abundance of older, unreinforced masonry structures that are inherently brittle and very vulnerable to seismic forces.

- Low Public Awareness of Vulnerability: Little public recognition of earthquake threat, and no established system of educating or informing the public of the threat or how to prepare for or respond during an earthquake. Therefore, higher losses will occur here than in other regions of the country.

3.3.11.2 Location

Rhode Island is located in the North Atlantic tectonic plate and is in a region of historically low seismicity. Additionally, the underlying geology of the State is largely composed of unsorted rock of varying size that is considered geologically stable and not prone to seismic amplification (RIEMA 2024).

Figure 32 shows the earthquake hazard potential for the eastern United States, with the entire state of Rhode Island being towards the lower end of the hazard potential. The Town of Coventry is indicated with the star on the map below.



Source: USGS 2018

Figure 32- Rhode Island Earthquake Hazard Map

3.3.11.3 Extent

Both the intensity and magnitude are considered during the measurement of the severity of earthquakes. The observed level of damage and effects on people, nature, and human structures are variables when describing the intensity. The severity of intensity generally increases with the amount of energy released and decreases with distance from the fault or epicenter of the earthquake. The scale most often used in the U.S. to measure intensity is the Modified Mercalli Intensity (MMI) Scale.

As shown in Table 33, the MMI Scale consists of 10 increasing levels of intensity that range from imperceptible to catastrophic destruction. Peak ground acceleration (PGA) is also used to measure earthquake intensity by quantifying how hard the earth shakes in a given location, or measured as acceleration due to gravity (g). The USGS describes the MMI Scale as:

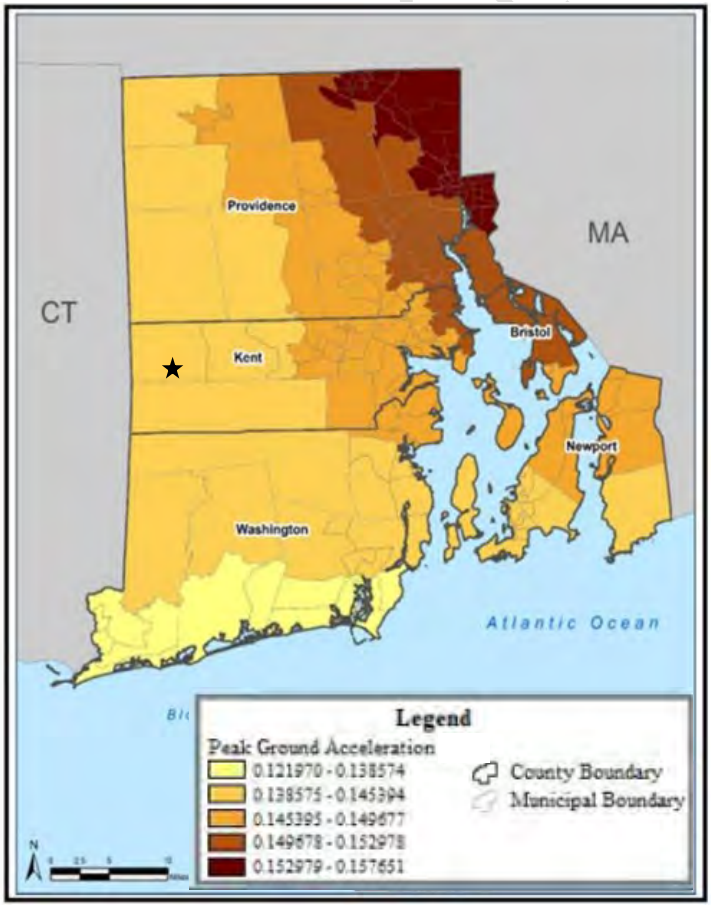
"The effect of an earthquake on the Earth's surface is called the intensity. The intensity scale consists of a series of certain key responses such as people awakening, movement of furniture, damage to chimneys, and finally - total destruction. Although numerous intensity scales have been developed over the last several hundred years to evaluate the effects of earthquakes, the one currently used in the United States is the Modified Mercalli (MM) Intensity Scale. The Modified Mercalli Intensity value assigned to a specific site after an earthquake has a more meaningful measure of severity to the non-scientist than the magnitude because intensity refers to the effects actually experienced at that place."

The following table is an abbreviated description of the comparisons of earthquake magnitude, intensity, PGA, perceived shaking, and damage.

Table 33- Magnitude/Intensity/Ground-Shaking Comparisons

Magnitude	Intensity	PGA (%g)	Perceived Shaking	Damage
1.0-3.0	I	<0.0464	Not felt	None
3.0-3.9	II-III	0.0464-0.297	Weak	None
4.0-4.9	IV	0.297-2.76	Light	None
	V	2.76-11.5	Moderate	Very light
5.0-5.9	VI	11.5-21.5	Strong	Light
	VII	21.5-40.1	Very Strong	Moderate
6.0-6.9	VIII	40.1-74.7	Severe	Moderate/Heavy
	IX	74.7-139	Violent	Heavy
7.0+	X+	>139	Extreme	Very Heavy

Figure 33 shows Rhode Island's PGA potential. Coventry is labeled as having a PGA of 0.138575-0.145394, which falls in the Magnitude 3.0-3.9/Intensity II-III (weak shaking, no damage) category above.



Source: RIEMA 2024

Figure 33- Rhode Island Potential Peak Ground Acceleration Map

Figure 34 shows a zoomed in map of Coventry's earthquake risk. The entire Planning Area is located in the 2% g category, which falls in the Magnitude 3.0-3.9/Intensity II-III (weak shaking, no damage) category above.

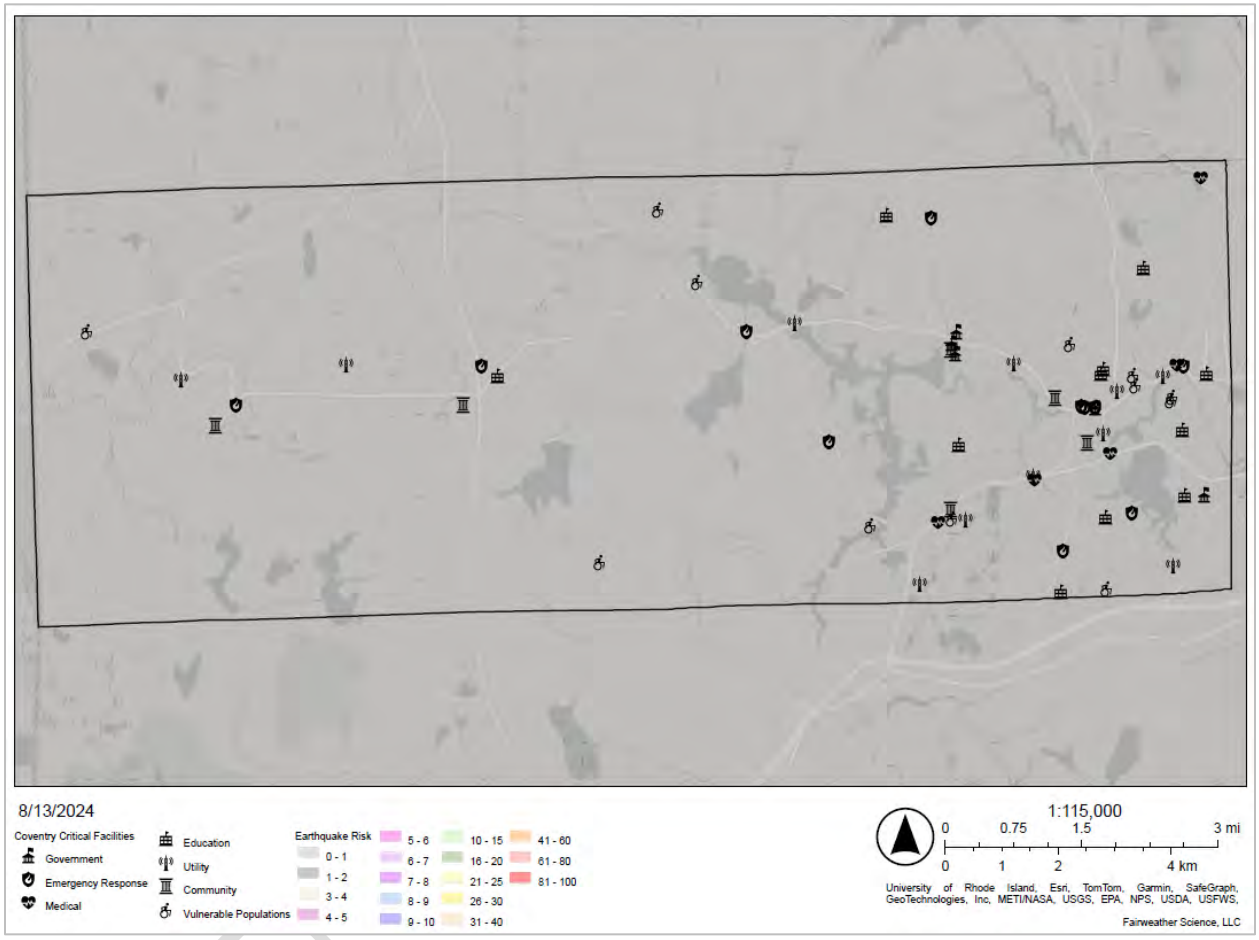


Figure 34- Coventry Earthquake Risk Map

RIEMA states that Coventry has the following planning significance related to earthquake:

Jurisdiction	Earthquake NRI	Earthquake EAL
Coventry	Very Low	Very Low

Source: RIEMA 2024 NRI: National Risk Index EAL: Expected Annual Loss

Based on the extent of past events and the criteria identified in Table 7, the extent of earthquakes in Coventry is considered **Negligible** with the potential of minor injuries; no shutdown of critical infrastructure and facilities; scattered incidental residential and commercial structure damages; and few or no operations impacted for short amounts of time.

3.3.11.4 History

The United States Geologic Survey (USGS) and the Boston College Weston Observatory maintain

earthquake records for the State of Rhode Island (RIEMA 2024). Data indicates that while the State has had numerous earthquakes, the largest on record occurred in June 1951 in Kingstown and was measured at a 4.6 on the Richter Scale. For both the USGS and Weston Observatory, reported earthquakes before 1951 had no recorded measured intensity (RIEMA 2024).

The Richter Scale measures the energy released by an earthquake using a seismograph. The Mercalli Intensity Scale measures the intensity of an earthquake by observing its effect on people, the environment and the earth's surface. The Modified Mercalli Scale (MMI) is the current standard for measuring intensity of earthquakes. The MMI is outlined in Table 33.

Table 34 lists historical earthquakes, M3.0 and greater within 50 miles of Coventry, from 1900-July 8, 2024. No damage was reported in Coventry as a result of any of these earthquakes.

Since the 2018 HMP, there has been 1 earthquake magnitude 3.0 and greater and within 50 miles of Coventry.

Table 34- Historical Earthquakes M3.0 and Greater within 50 miles of Coventry

Date	Latitude	Longitude	Magnitude	Location
03/11/1976	41.56	-71.21	3.5	5 km SE of Portsmouth, Rhode Island
12/20/1977	41.84	-70.7	3.1	7 km NW of White Island Shores, Massachusetts
01/27/1982	41.87	-70.97	3	2 km WNW of North Lakeville, Massachusetts
06/17/1982	41.508	-72.377	3	6 km E of Moodus, Connecticut
08/24/1989	41.614	-70.899	3	2 km S of Fairhaven, Massachusetts
03/22/1996	41.69	-71.242	3.1	2 km NE of Bristol, Rhode Island
01/12/2015	41.7482	-71.9019	3.3	0 km NE of Wauregan, Connecticut
11/08/2020	41.5208	-70.9546	3.6	10 km S of Bliss Corner, Massachusetts

Source: USGS 2024

3.3.11.5 Impact

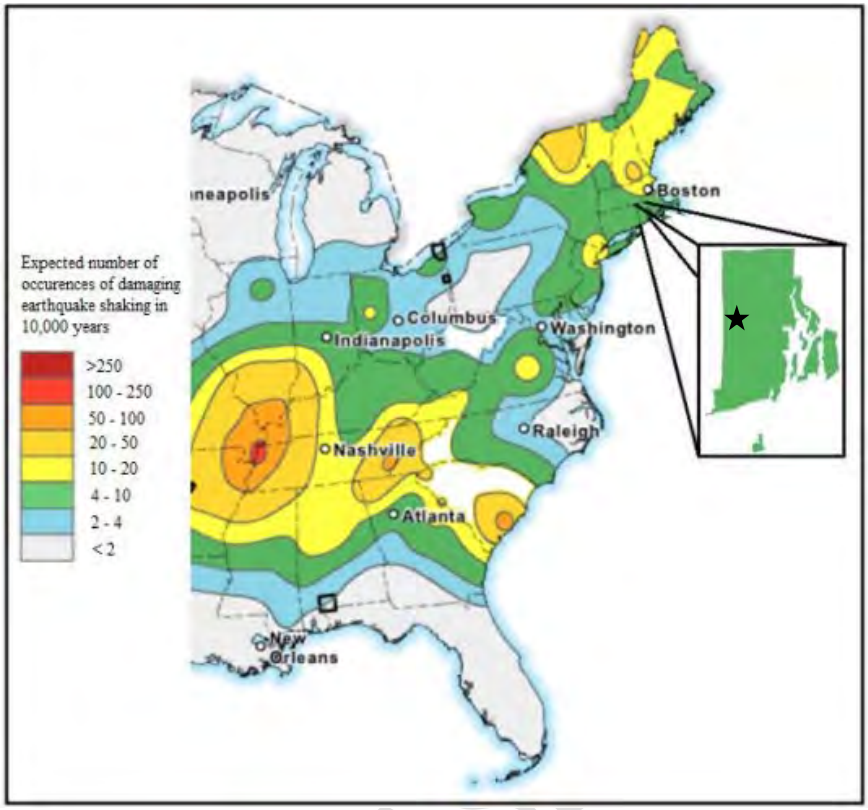
The Planning Team recognizes that the potential for an earthquake to significantly shake the Town of Coventry is low, but the hazard could afflict Town wide damage, causing power outages, building collapses, water main breaks, dam failures, gas leaks, fires and injuries or deaths.

Structures in Coventry may be particularly vulnerable to the effect of a moderate to large earthquake as seismic design criteria are not required for either new building construction or old building renovation. Buildings that are most at risk from earthquakes are the old masonry buildings and large structures such as those in the Historic Districts.

3.3.11.6 Probability of Future Occurrence

While it is not possible to predict an earthquake, the USGS has developed earthquake probability maps that use the most recent earthquake rate and probability models to predict future earthquake potential.

Figure 35 illustrates potential earthquake events in Rhode Island. This map estimates the number of damaging earthquakes in 10,000 years. The entire state of Rhode Island is in the category of 4-10 expected number of earthquakes in 10,000 years.



Source: USGS 2022

Figure 35- Rhode Island Earthquake Probability

Based on previous events and the criteria identified in Table 8, it is **Possible** that Coventry will experience an earthquake event in the calendar year; there is a between 1-49.9% annual probability of occurring. However, it is unlikely that future earthquakes will cause significant damage to the Town.

3.3.11.7 Future Conditions Including Climate Change

It is unlikely that climate change will influence the nature, location, extent, impact, or recurrence probability of future earthquakes, including population and land use and development on human timescales (RIEMA 2024).

3.4 Summary of Vulnerability

This section outlines the risk and vulnerability processes from various hazard impacts in determining potential losses for the Town.

This section addresses the remaining portion of Element B and a portion of Element G of the Local Mitigation Plans regulation checklist.

Regulation Checklist- 44 CFR § 201.6 Local Mitigation Plans
ELEMENT B. Risk Assessment
B2. Does the plan include a summary of the jurisdiction's vulnerability and the impacts on the community from the identified hazards? Does this summary also address NFIP-insured structures that have been repetitively damaged by floods? (Requirement 44 CFR § 201.6(c)(2)(ii)) B2-a. Does the plan provide an overall summary of each jurisdiction's vulnerability to the identified hazards? B2-c. Does the plan address NFIP-insured structures within each jurisdiction that have been repetitively damaged by floods?
Source: FEMA 2022 (Local)

Regulation Checklist- 44 CFR § 201.6 Local Mitigation Plans
ELEMENT G. High Hazard Potential Dams (HHPD) (Optional)
HHPD2. Did the plan address HHPDs in the risk assessment? HHPD2-a. Does the plan describe the risks and vulnerabilities to and from HHPDs?
Source: FEMA 2022 (Local)

3.4.1 Overview

A vulnerability analysis estimates the exposure extent that may result from a hazard event, within a given area and with a given intensity. This analysis provides quantitative data that may be used to identify and prioritize potential mitigation measures. This then allows the communities to focus their efforts and attention on areas with the greatest risk of damage.

Table 35 shows the overview of the Town of Coventry's infrastructure hazard vulnerability, including the level of concern the CEMA Planning Team assigned to each hazard.

Table 35- Vulnerability Overview

Hazard	Area's Hazard Vulnerability			
	% of Geographic Area	% of Critical Facilities and Utilities	% of Residences	CEMA Planning Team Level of Concern
Severe Thunderstorm	100%	100%	100%	Low
Dam Failure	5%	6.85%	6.30%	High
Flooding	20%	1.37%	14.5%	Medium
Riverine Erosion	10%	0%	0%	Medium
Tropical & Extratropical Storms	100%	100%	100%	Medium
Severe Winter Weather	100%	100%	100%	Medium
Brushfire	100%	100%	100%	Low

Table 35- Vulnerability Overview

Hazard	Area's Hazard Vulnerability			
	% of Geographic Area	% of Critical Facilities and Utilities	% of Residences	CEMA Planning Team Level of Concern
Drought	100%	100%	100%	Low
Extreme Temperatures	100%	100%	100%	Low
Tornadoes	100%	100%	100%	Low
Earthquake	100%	100%	100%	Low

3.4.2 Population and Residential Buildings

Current population data for the Town of Coventry was obtained from the 2020 Decennial US Census. The 2020 US Census reports that Coventry's population is 35,688 individuals and there are a total of 14,931 housing units in the Town (US Census 2024).

Estimated replacement values for residential building structures were obtained from the 2022 American Community Survey (US Census), which estimated the median home value per structure was $298,100 (US Census 2024- Table B25077). However, US Census replacement values are generally understated.

The United States Department of Housing and Urban Development (HUD) completed a new study in 2022 for Tribal communities throughout the United States and estimates an average 3-bedroom residential structure in Narragansett, RI (25 miles SE of Coventry) has a replacement value of $467,423 (HUD 2022). The more conservative HUD approximation for replacement value was used for this analysis.

Table 36- Estimated Population and Residential Building Inventory

Population	Residential Buildings	
2020 Census	Total Housing Units (2020 Census data)	Total Value of Buildings*
35,388	14,931	US Census: $4,450,931,100 HUD: **$6,979,092,813** (used for analysis)

Sources: US Census 2024- Coventry town, Kent County, Rhode Island population data, HUD 2022

3.4.3 Methodology

An analysis was conducted to assess the risks of each identified hazard. This analysis looked at the potential effects of each hazard on values of critical facilities at risk without considering the probability or level of damage. The analysis also represents the number of people at risk from each hazard but does not estimate the number of potential injuries or deaths.

The critical facilities identified in the 2018 HMP were used as the foundation to complete this analysis. The Planning Team provided information on newly constructed facilities and these critical facilities were then added to the inventory.

<table>
<tr><th>Hazard</th><th>Methodology</th></tr>
<tr><td>Severe Thunderstorm (High Wind, Lightning, Hail), Severe Winter Weather (Snow Storm, Ice Storm) Brushfire, Drought, Extreme Temperatures, Tornado, Earthquake</td><td>It is assumed that the entire Coventry Planning Area and all identified critical facilities are threatened by these hazards (100%).</td></tr>
<tr><td>Dam Failure</td><td>RIDEM has a library of engineering reports for dams in Rhode Island. These reports contain information on the hazard potential assessment, estimated approximate flood impact area, and inundation maps, when available. The available inundation maps are digitized and are publicly available on ArcGIS online.

Critical facilities: The available digitized inundation maps were overlayed on the critical facilities data to determine the critical facilities in an inundation area.

Residences: Available digitized inundation maps were overlayed on the Town 2022 parcel map data. An “intersect” query was run to determine which parcels intersected an inundation area. The results of this query were then filtered by “Building Type” to remove any non-residential properties. The loss estimations utilizing this method are likely overestimated as a parcel may only partially be inundated during a dam failure, and the residential structure on the parcel may not have been affected. However, it is beyond the scope of this HM&FMP to determine the percentage of the residential structure that may be affected during a dam failure event.

The number of residential parcels that was determined to be at risk of damage during a dam failure was 941 out of the entire 14,497 parcels in the Town dataset.</td></tr>
<tr><td>Hurricane</td><td>For the 2018 HMP, Hazus was used to understand the potential risk from a large hurricane. Hazus is a FEMA software tool that contains models for estimating potential losses from earthquakes, floods, and hurricanes.

The results of the 2018 hurricane scenario were used for this HM&FMP Update as there has been little to no changes in development or risk in Coventry since 2018.

The Hazus results from the 2018 HMP are below:

Table 37- 1954 Hurricane Carol (Category 1) Hazus Loss Estimations
<table><tr><th>Damage</th><th>Loss Amount</th></tr><tr><td>Debris generated</td><td>36,990 tons</td></tr><tr><td>Buildings destroyed</td><td>1</td></tr><tr><td>Buildings at least moderately damaged</td><td>125</td></tr><tr><td>Displaced households</td><td>27</td></tr><tr><td>Essential Facility Damage (fire, police, schools)</td><td>Less than 1 day loss</td></tr><tr><td>Residential Property (capital stock)</td><td>$49 million</td></tr><tr><td>Business interruptions</td><td>$1.6 million</td></tr></table>
In 1954 Hurricane Carol (peak gusts at 89 mph) tore through Southern New England, causing extensive damage throughout Rhode Island. If this same storm were to strike again today, it would cause over $50 million dollars in total economic losses (property damage and business interruption loss). About 120 buildings are expected to be at least moderately damaged. An estimated 1 of the 120 buildings would be totally destroyed.</td></tr>
<tr><td>Flooding</td><td>Critical facilities: FEMA FIRMs maps (3/2/2009 and 10/2/2015) were overlayed on the critical facilities data to determine the critical facilities in Special Flood Hazard Areas (SFHAs). Other</td></tr>
</table>

Hazard	Methodology
	areas or historically threatened facilities/residences gathered through meetings with the Planning Team and public input were also identified. Residences: FEMA FIRMs maps (3/2/2009 and 10/2/2015) were overlayed on the Town 2022 parcel map data. An "intersect" query was run to determine which parcels intersected the 1% or 0.2% annual change flood hazard areas. The results of this query were then filtered by "Building Type" to remove any non-residential properties. The loss estimations utilizing this method are likely overestimated as a parcel may only partially be flooded during a 1% or 0.2% chance flood, and the residential structure on the parcel may not have been affected. However, it is beyond the scope of this HM&FMP to determine the percentage of the residential structure that may be affected during a flooding event. The number of residential parcels that was determined to be at risk of damage during a 1% or 0.2% chance flood was **2,165** out of the entire 14,497 parcels in the Town dataset.
Riverine Erosion	During the development of this HM&FMP Update, there is currently no mapping on erosion hazard areas in Coventry. Erosion hazard areas and threatened critical facilities were determined by the Planning Team and through information provided by the public through the public survey.

3.4.4 Data Limitations

The provided vulnerability estimates use the best data currently available, and the methodologies used result in a risk approximation. These estimates may be used to understand relative risk from hazards and potential losses; however, uncertainties are inevitable in any loss estimation. This is due in part to incomplete scientific knowledge or data concerning hazards and their effects on the built environment, as well as the use of approximations and simplifications, when necessary, for a comprehensive analysis.

It should be noted that the results from the quantitative vulnerability assessment are limited to the exposure of people, buildings, and critical facilities and infrastructure to the identified hazards. It was beyond the scope of this HM&FMP Update to develop a more detailed or comprehensive assessment of risk. A more comprehensive assessment may include loss of facility/system function, annualized losses, people injured or killed, shelter requirements, and/or economic losses. Such impacts may be addressed with future updates of this HM&FMP Update or other planning documents.

3.4.5 Critical Facilities Inventory

A critical facility is defined as a facility that provides essential products and services to the public. They assist in preserving quality of life and fulfill important public safety, emergency response, and disaster recovery functions.

Table 38- Town of Coventry Critical Facilities

Facility Type	Facility Name	Location	Facility Value	Owner	Hazards Vulnerable To			
					Severe Thunderstorm, Tropical & Extratropical Storms, Severe Winter Weather, Brushfire, Drought, Extreme Temperatures, Tornadoes, Earthquake	Dam Failure	Flooding	Erosion
Government	Town Hall Offices	1670 Flat River Rd	$292,010,000	Town of Coventry	x			
	Town Hall Annex , School District, Emergency Operations Center, Coventry Teen Center	1675 Flat River Rd	$631,920,000	Town of Coventry	x			
	Coventry Town Offices	1075 Main St	$81,090,000	Town of Coventry	x	x		
	Coventry Housing Authority	30 Mulhearn Dr	$520,100,000	Coventry Housing Authority	x			
	Department of Public Works	1668 Flat River Rd	$12,000,000^	Town of Coventry	x			
Emergency Response	Hopkins Hill Fire Company	1 Bestwick Trail	$41,920,000	Hopkins Hill Rd Fire Dept	x			
	Tiogue Fire District	240 Arnold Rd	$33,620,000	Central Coventry Fire District (Tiogue)	x			
	Coventry Fire Department	1111 Main St	$9,140,000	Western Ri Civic Historical Society Inc	x	x		
	Coventry/Anthony Fire District	571 Washington St	$69,610,000	Coventry Fire District	x			
	Western Coventry Fire District	2 Hopkins Hollow Rd	$20,280,000	Western Coventry Fire District	x			
	Western Coventry Fire District & Emergency Shelter	1110 Victory Hwy	$102,500,000	Western Coventry Fire District	x			
	Central Coventry Fire Station	2847 Flat River Rd	$36,080,000	Central Coventry Fire District	x			
	Coventry Police & Emergency Shelter	1075 Main St	$81,090,000	Town of Coventry	x			
	Rhode Island Army National Guard Readiness Center	570 Read School House Rd	$267,560,000	United States of America	x			
Medical	Riverview Rehabilitation & Healthcare Center	546 Main St	$784,990,000	Riverview Nursing Home Inc	x			
	Kent Hospital Laboratory Services	1620 Nooseneck Hill Rd	$36,280,000	Coventry Primary Care Realty Co LLC	x			
	Village Medical	982 Tiogue Ave	$108,400,000	Tiogue Avenue Associates	x			

Facility Type	Facility Name	Location	Facility Value	Owner	Hazards Vulnerable To			
					Severe Thunderstorm, Tropical & Extratropical Storms, Severe Winter Weather, Brushfire, Drought, Extreme Temperatures, Tornadoes, Earthquake	Dam Failure	Flooding	Erosion
				LLC				
	Caring for Women	705 Tiogue Ave	$20,250,000	Marley-Clift LLC	x	x		
	Care New England Medical Group Family Medicine	595 Washington St	$43,200,000	595 Washington Street LLC	x			
Education	J Arthur Trudeau Memorial Center Pathways Strategic Teaching Center	75 Centre Of New England Blvd	$99,960,000	J Arthur Trudeau Memorial Cent	x			
	Hopkins Hill School	95 Johnson Blvd	$207,900,000	Town of Coventry	x			
	Tiogue School	170 East Shore Dr	$227,350,000	Town of Coventry	x			
	Coventry High School, Regional Career Center, & Emergency Shelter	40 Reservoir Rd	$1,676,570,000	Town of Coventry	x			
	Alan Shawn Feinstein Middle School	15 Foster Dr	$1,044,900,000	Town of Coventry	x			
	Our Lady of Czestochowa	222 Macarthur Blvd	$112,160,000	Church of Our Lady of Czestochowa	x			
	Blackrock School	12 La Casa Dr	$246,930,000	Town of Coventry	x			
	Washington Oak School	801 Read School House Rd	$678,710,000	Town of Coventry	x			
	Western Coventry School	4588 Flat River Rd	$212,610,000	Town of Coventry	x			
	Father John V Doyle Elementary	343 South Main St	$414,080,000	St John & Paul Parish Corp	x			
Utility	Woodland Manor Sewer Pumping Station & Force Main	250 Woodland Dr	$5,430,000^	Town of Coventry	x			
	Sandy Bottom Road Sewer Pump Station	90 Sandy Bottom Rd	$5,430,000	Town of Coventry	x	x		
	Industrial Drive Sewer Pump Station	41.6977, -71.5796	$5,430,000^	Not Listed	x			
	Arnold Road Sewer Pump Station	41.6657, -71.5457	$5,430,000^	Not Listed	x			
	Generator	2400 Nooseneck Hill Rd	$121,010,000	Kent County Water Authority	x			
	Electrical Substation	28 Knotty Oak Rd	$740,000	Kent County Water Authority	x			

Facility Type	Facility Name	Location	Facility Value	Owner	Hazards Vulnerable To			
					Severe Thunderstorm, Tropical & Extratropical Storms, Severe Winter Weather, Brushfire, Drought, Extreme Temperatures, Tornadoes, Earthquake	Dam Failure	Flooding	Erosion
	Lewis Farm Road Solar Array	100 Lewis Farm Rd	$500,000^	Coventry Solar LLC	x		x (A zone)	
	Flat River Road Solar Array	41.6976, -71.7216	$500,000^	Capwell Diane A Trustee	x			
	Arnold Road Commercial Solar Farm	451 Arnold Road	$500,000^		x			
	Electrical Substation	990 Tiogue Ave	$740,000^	Not Listed	x			
	Electrical Substation	643 Washington St	$740,000^	Not Listed	x	x		
	Electrical Substation	2535 Flat River Rd	$740,000^	Narragansett Electric Company	x			
	Backup Generator 1- CPD	60 Wood St	$5,000^	Town of Coventry	x			
	Backup Generator 2- DHS	50 Wood St	$5,000^	Town of Coventry	x			
	Backup Generator 3- Communication tower	570 Read School House Rd	$5,000^	Town of Coventry	x			
	Backup Generator 4- EMA/EOC	1675 Flat River Rd	$5,000^	Town of Coventry	x			
Dams (High and Significant)	167- Flat River Reservoir Dam	41.6944, -71.5947	$150,000^	Town of Coventry	x			
	176- Coventry Reservoir Dam	41.7008, -71.6365	$150,000^	Town of Coventry	x			
	177- Tiogue Lake Dam	41.6848, -71.5507	$150,000^	Denise Oneppo	x			
	185- Black Rock Reservoir Dam	41.7200, -71.5537	$150,000^	In foreclosure	x			
	371- Pearce Pond Dam	41.7236, -71.5392	$150,000^	Georges Bockstael	x			
	561- Arnold Pond Dam	41.6681, -71.7497	$150,000^	The Greene Company	x			
	152- Mill Pond Dam	41.6955, -71.5469	$150,000^	Unknown- in foreclosure	x			
	175- Quidnick Reservoir Dam	41.6854, -71.6777	$150,000^	YMCA of Pawtucket, Inc.	x			
	186- Upper Pond Dam	41.7046, -71.5537	$150,000^	Town of Coventry	x			
	187- Middle Pond Dam	41.7000, -71.5540	$150,000^	Michael E. & Roberta Soucy	x			
	498- Hopkins Farm Pond Dam	41.6948, -71.5714	$150,000^	Island Green Golf, LLC	x			
	645- Center of New England #1	41.6683, -71.5523	$150,000^	Commerce Park Realty, LLC	x			

Facility Type	Facility Name	Location	Facility Value	Owner	Hazards Vulnerable To			
					Severe Thunderstorm, Tropical & Extratropical Storms, Severe Winter Weather, Brushfire, Drought, Extreme Temperatures, Tornadoes, Earthquake	Dam Failure	Flooding	Erosion
	Dam							
Community	Greene Public Library	179 Hopkins Hollow Rd	$35,590,000	Greene Public Library Corp	x			
	Summit Library	15 Old Summit Rd	$15,810,000	Town of Coventry	x			
	Post Office	1550 Nooseneck Hill Rd	$99,330,000	United States of America	x			
	Coventry Public Library	1672 Flat River Rd	$20,000,000^	Town of Coventry	x			
	Guy Lefebvre Community Center	1277 Main St	$54,050,000	Town of Coventry	x			
	Coventry Resource and Senior Center	50 Wood St	$75,000,000^	Town of Coventry	x			
Vulnerable Populations	Brookdale Centre of New England	600 Centre Of New England Blvd	$1,023,050,000	BKD New England Bay LLC	x			
	Summer Villa	51 Laurel Ave	$99,950,000	Fresh Start Consulting LLC	x			
	Alpine Nursing Home	557 Weaver Hill Rd	$150,380,000	Alpine Realty LLC	x			
	Woodpecker Hill Nursing Home	2052 Plainfield Pike	$146,490,000	Green Acres Health Center LLC	x			
	Woodland Apartments	20 Woodland Dr	$928,160,000	Springfield Armory Lp	x			
	Golden Ridge Housing	2 Contentment Dr	$167,720,000	Golden Ridge Housing	x			
	Trudeau Group Home	55 Lakehurst Dr	$29,220,000	State of Rhode Island	x			
	18 Reddington St. Group Home	18 Reddington St	$30,370,000	State of Rhode Island	x			
	Station Street Group Home	204 Station St	$33,080,000	State of Rhode Island	x			
	Whitman Road Group Home	1 Whitman Rd	$29,700,000	State of Rhode Island	x			
	Life Chaplin	112 Chaplin Dr	$32,850,000	State of Rhode Island	x			
	Coventry Housing Authority	14 Manchester Cir	$548,450,000	Town of Coventry Housing Authority	x			
Roads, Bridges, Culverts*	19 roads (1 mile each)		$9,500,000		x	x	x	x
	1 bridge		$1,000,000		x	x	x	x
	4 culverts		$1,000,000		x	x	x	x

Facility Type	Facility Name	Location	Facility Value	Owner	Hazards Vulnerable To			
					Severe Thunderstorm, Tropical & Extratropical Storms, Severe Winter Weather, Brushfire, Drought, Extreme Temperatures, Tornadoes, Earthquake	Dam Failure	Flooding	Erosion
		Total:	**$11,718,420,000**					

^ Value of the facility was not available. Listed value is an approximation based on similar facilities.

* This is not the entire inventory of roads, bridges, and culverts in the Town. These were selected for consideration in the risk assessment due to their vulnerability to erosion from recent disasters. This methodology will produce an underestimation for replacement values for these structures due to the hazards listed in the first column.

Figure 36 shows the location of Coventry's identified critical facilities.

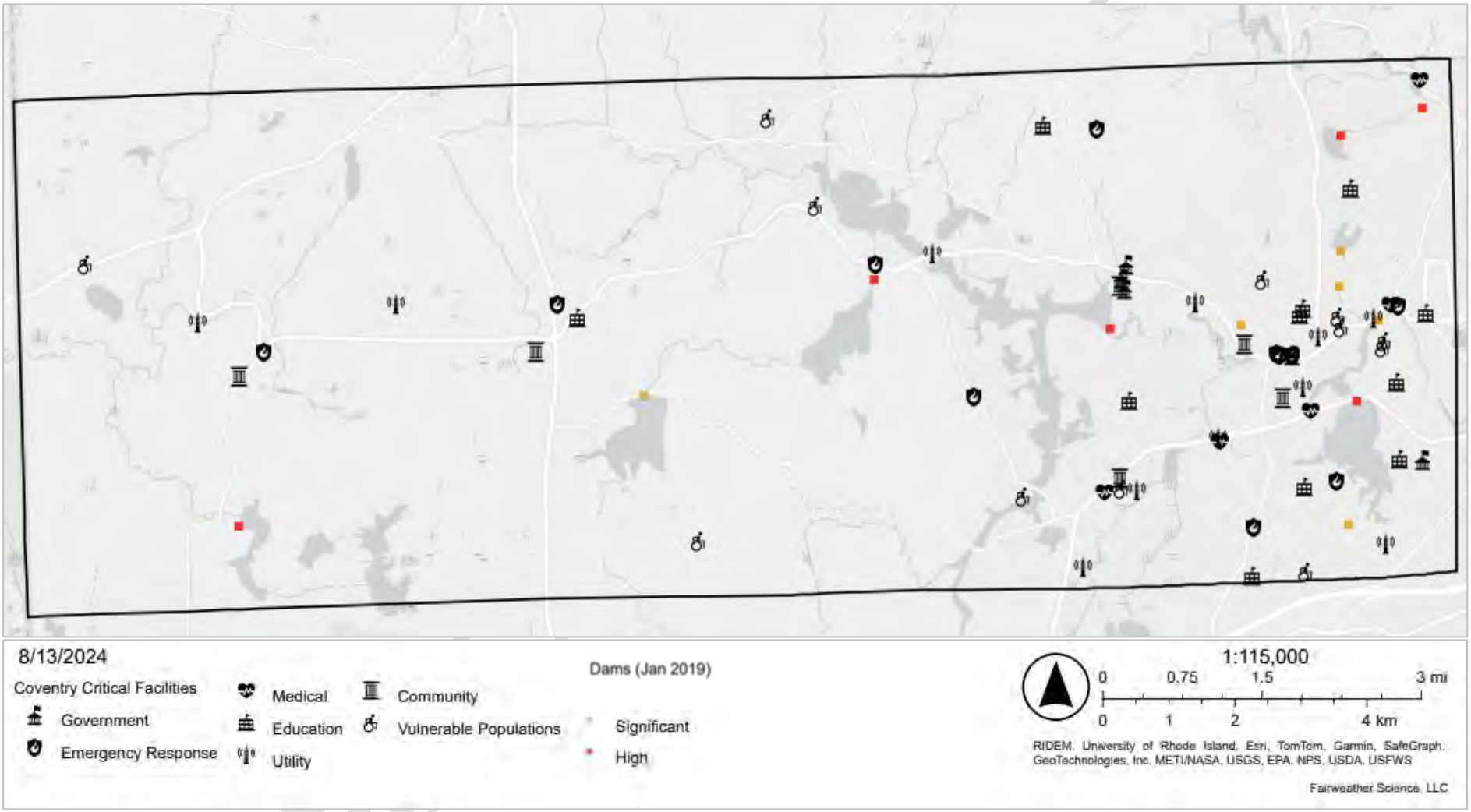


Figure 36- Map of Critical Facilities in the Town of Coventry

3.4.6 Vulnerability Exposure Analysis

Table 39 summarizes the results of the vulnerability exposure analysis for loss estimations in the Town of Coventry.

Table 39- Vulnerability Exposure Analysis

	Government	Emergency Response	Medical	Education	Utility	Dams	Community	Vulnerable Populations	Roads, Bridges, and Culverts	Total
Severe Thunderstorm	# of CFs: 5 Value of CFs: $1,537,120,000	# of CFs: Value of CFs: $661,800,000	# of CFs: 5 Value of CFs: $993,120,000	# of CFs: 10 Value of CFs: $4,921,170,000	# of CFs: 16 Value of CFs: $147,210,000	# of CFs: 12 Value of CFs: $1,800,000	# of CFs: 6 Value of CFs: $299,780,000	# of CFs: 12 Value of CFs: $3,219,420,000	# of CFs: 24 Value: 11,500,000*	# of CFs: 99 Value of CFs: $11,781,420,000
Dam Failure	# of CFs: 1 Value of CFs: $91,090,000	# of CFs: 1 Value of CFs: $9,140,000	# of CFs: 1 Value of CFs: $20,250,000	-	# of CFs: 2 Value of CFs: $6,170,000	-	-	-	# of CFs: 24 Value: 11,500,000*	# of CFs: 29 Value of CFs: $128,150,000
Flooding	-	-	-	# of CFs: 1 Value of CFs: $500,000	-	-	-	-	# of CFs: 24 Value: 11,500,000*	# of CFs: 25 Value of CFs: $12,000,000
Erosion	-	-	-	-	-	-	-	-	# of CFs: 24 Value: 11,500,000*	# of CFs: 24 Value of CFs: $11,500,000
Tropical & Extratropical Storms	# of CFs: 5 Value of CFs: $1,537,120,000	# of CFs: Value of CFs: $661,800,000	# of CFs: 5 Value of CFs: $993,120,000	# of CFs: 10 Value of CFs: $4,921,170,000	# of CFs: 16 Value of CFs: $147,210,000	# of CFs: 12 Value of CFs: $1,800,000	# of CFs: 6 Value of CFs: $299,780,000	# of CFs: 12 Value of CFs: $3,219,420,000	# of CFs: 24 Value: 11,500,000*	# of CFs: 99 Value of CFs: $11,781,420,000
Brushfire	# of CFs: 5 Value of CFs: $1,537,120,000	# of CFs: Value of CFs: $661,800,000	# of CFs: 5 Value of CFs: $993,120,000	# of CFs: 10 Value of CFs: $4,921,170,000	# of CFs: 16 Value of CFs: $147,210,000	# of CFs: 12 Value of CFs: $1,800,000	# of CFs: 6 Value of CFs: $299,780,000	# of CFs: 12 Value of CFs: $3,219,420,000	# of CFs: 24 Value: 11,500,000*	# of CFs: 99 Value of CFs: $11,781,420,000
Drought	# of CFs: 5 Value of CFs: $1,537,120,000	# of CFs: Value of CFs: $661,800,000	# of CFs: 5 Value of CFs: $993,120,000	# of CFs: 10 Value of CFs: $4,921,170,000	# of CFs: 16 Value of CFs: $147,210,000	# of CFs: 12 Value of CFs: $1,800,000	# of CFs: 6 Value of CFs: $299,780,000	# of CFs: 12 Value of CFs: $3,219,420,000	# of CFs: 24 Value: 11,500,000*	# of CFs: 99 Value of CFs: $11,781,420,000
Extreme Temperatures	# of CFs: 5 Value of CFs: $1,537,120,000	# of CFs: Value of CFs: $661,800,000	# of CFs: 5 Value of CFs: $993,120,000	# of CFs: 10 Value of CFs: $4,921,170,000	# of CFs: 16 Value of CFs: $147,210,000	# of CFs: 12 Value of CFs: $1,800,000	# of CFs: 6 Value of CFs: $299,780,000	# of CFs: 12 Value of CFs: $3,219,420,000	# of CFs: 24 Value: 11,500,000*	# of CFs: 99 Value of CFs: $11,781,420,000

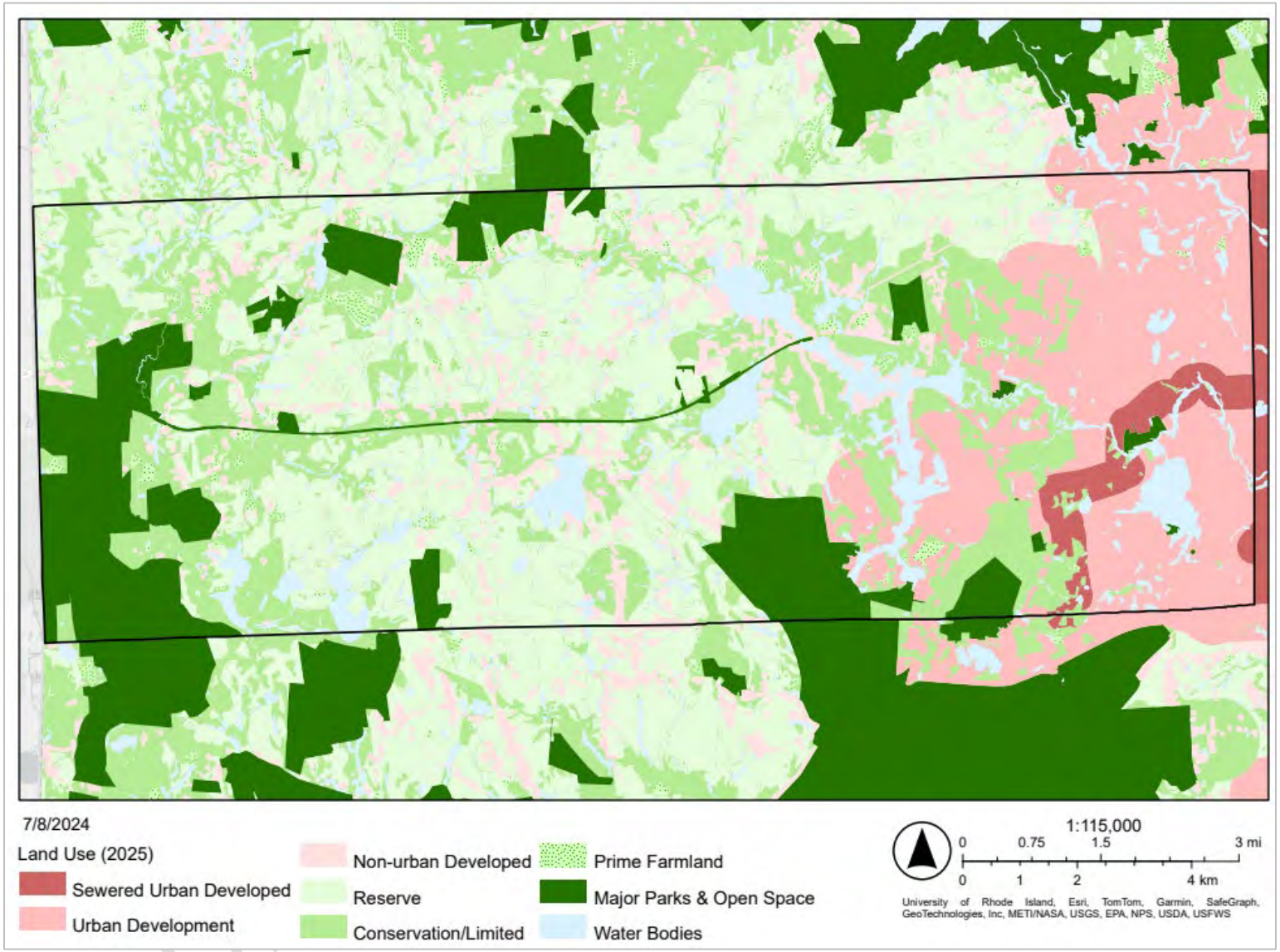
	Government	Emergency Response	Medical	Education	Utility	Dams	Community	Vulnerable Populations	Roads, Bridges, and Culverts	Total
Tornadoes	# of CFs: 5 Value of CFs: $1,537,120,000	# of CFs: Value of CFs: $661,800,000	# of CFs: 5 Value of CFs: $993,120,000	# of CFs: 10 Value of CFs: $4,921,170,000	# of CFs: 16 Value of CFs: $147,210,000	# of CFs: 12 Value of CFs: $1,800,000	# of CFs: 6 Value of CFs: $299,780,000	# of CFs: 12 Value of CFs: $3,219,420,000	# of CFs: 24 Value: 11,500,000*	# of CFs: 99 Value of CFs: $11,781,420,000
Earthquake	# of CFs: 5 Value of CFs: $1,537,120,000	# of CFs: Value of CFs: $661,800,000	# of CFs: 5 Value of CFs: $993,120,000	# of CFs: 10 Value of CFs: $4,921,170,000	# of CFs: 16 Value of CFs: $147,210,000	# of CFs: 12 Value of CFs: $1,800,000	# of CFs: 6 Value of CFs: $299,780,000	# of CFs: 12 Value of CFs: $3,219,420,000	# of CFs: 24 Value: 11,500,000*	# of CFs: 99 Value of CFs: $11,781,420,000

* These infrastructure are at risk of impacts from the identified hazards, but exact replacement values of roads, bridges, and culverts were not available at the time of this HMP update. For this analysis, it was assumed that 19 roads (1 mile each) (replacement value: $500,000/mile), 1 bridge (replacement value: $1,000,000), and 4 culverts (replacement value: $250,000/each) are threatened by erosion. The Planning Team has identified this is a data gap and selected a mitigation project to collect this data within the next five years to include in the next HM&FMP Update.

3.4.7 Land Use Patterns

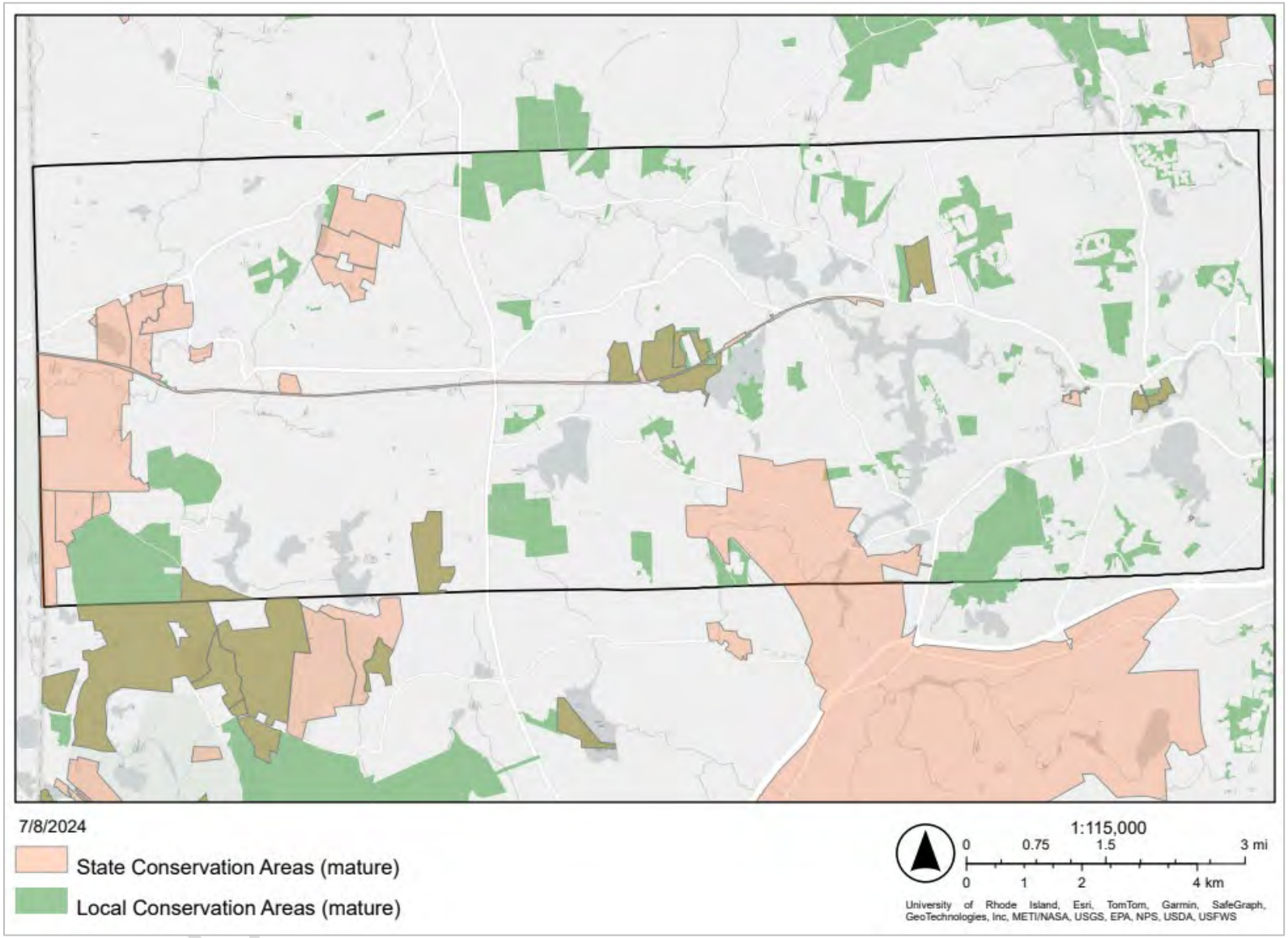
Figure 37 shows the current land use in Coventry in 2024, Figure 38 shows state and local conservation areas in Coventry, Figure 39 shows wetlands in Coventry, and Figure 40 shows the projected future land use in Coventry by 2043.

Currently, urban development is located in the eastern portion of the Town. There are large portions of the Town that are categorized as conservation lands, reserve, and major parks & open space. There are several large waterbodies throughout the Town.



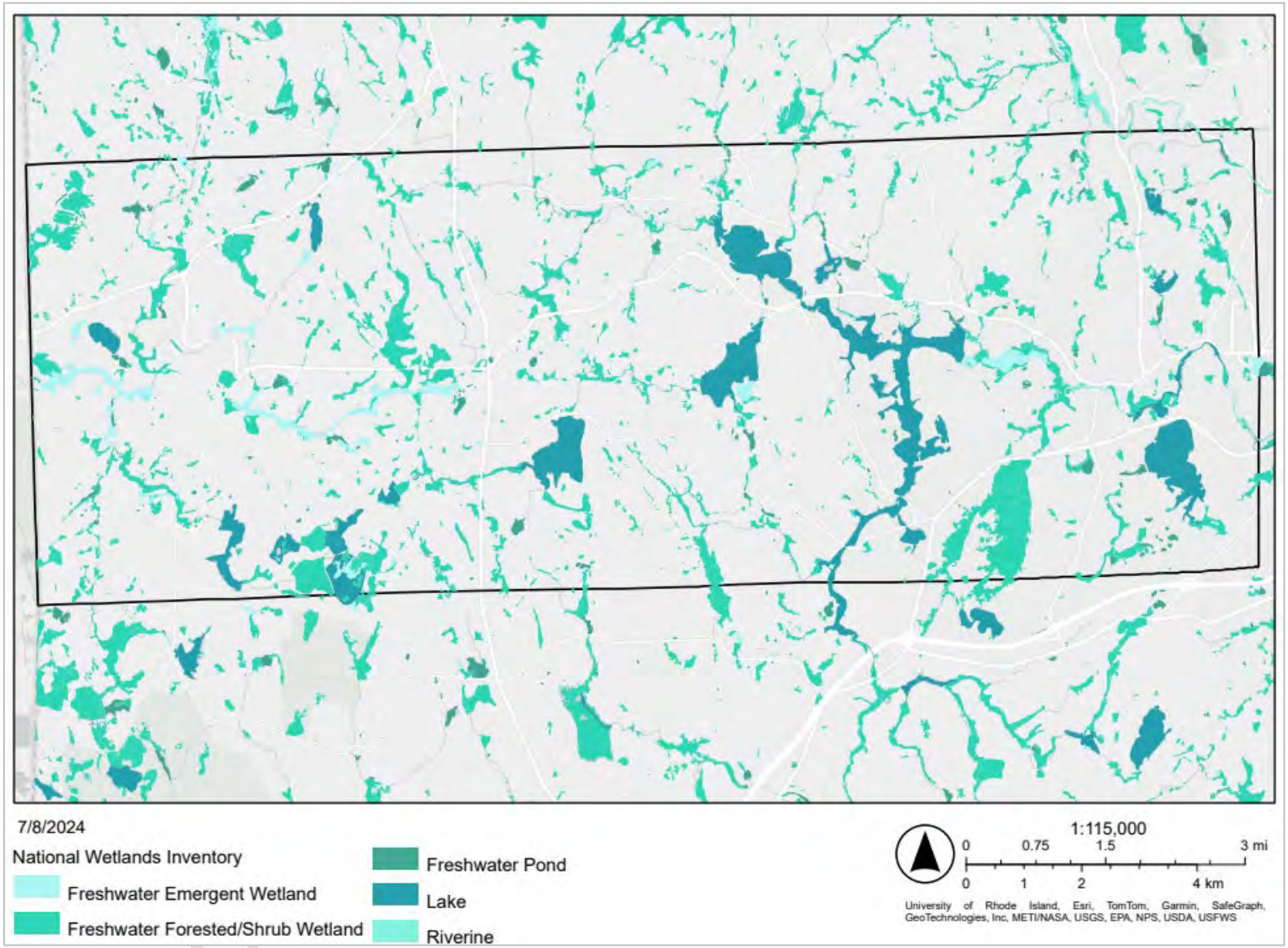
Source: RIGIS 2024- Land Use (2024), updated 4/11/2024

Figure 37- Current Land Use in Coventry



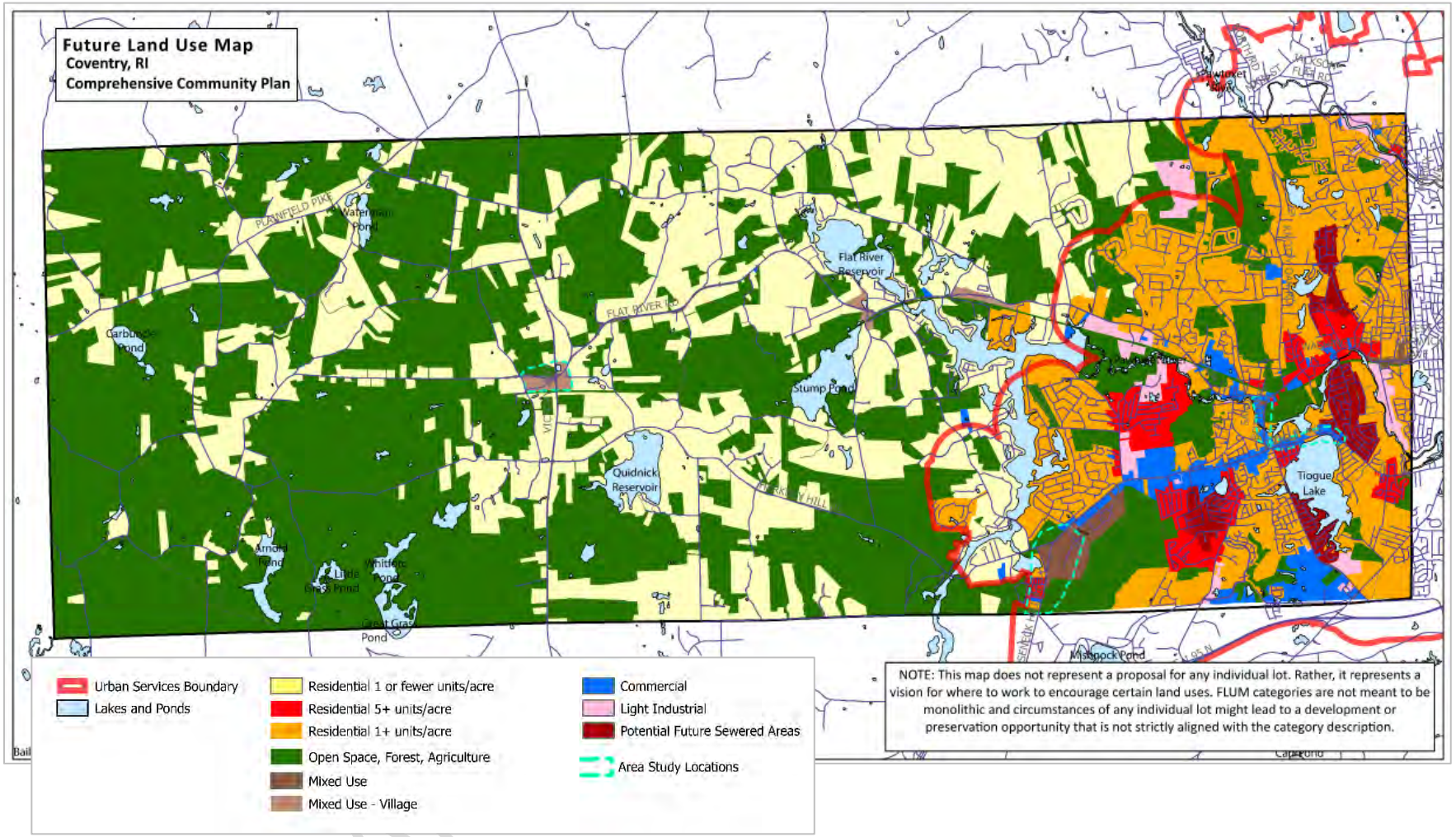
Source: RIGIS 2024- State and Local Conservation Areas, updated 4/18/2024

Figure 38- Conservation Areas in Coventry



Source: RIGIS 2024- USFWS National Wetlands Inventory, updated 1/19/2024

Figure 39- Wetlands in Coventry



Source: Coventry 2023 Draft Comprehensive Plan

Figure 40- Future Land Use in Coventry (2043)