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# TOWN OF PRESTON ANNEX DOCUMENT

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Southeastern Connecticut Council of Governments  
Multi-Jurisdictional Hazard Mitigation and Climate Adaptation Plan Update

March 2023



**PREPARED FOR:**

Town of Preston  
389 Route 2  
Preston, CT 06365  
[www.preston-ct.org](http://www.preston-ct.org)

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<b>1. INTRODUCTION .....</b>	<b>4</b>
1.1. PURPOSE OF ANNEX.....	4
1.2. HAZARD MITIGATION AND CLIMATE ADAPTATION GOALS .....	5
<b>2. COMMUNITY PROFILE .....</b>	<b>6</b>
2.1. PHYSICAL SETTING .....	6
2.2. DRAINAGE BASINS AND HYDROLOGY .....	8
2.3. LAND COVER .....	9
2.4. POPULATION, DEMOGRAPHICS, AND DEVELOPMENT TRENDS.....	9
2.5. GOVERNMENTAL STRUCTURE.....	10
2.6. REVIEW OF EXISTING PLANS AND REGULATIONS .....	11
2.7. CRITICAL FACILITIES, SHELTERING CAPACITY, AND EVACUATION .....	13
2.8. REPETITIVE LOSS PROPERTIES.....	15
2.9. EXPOSURE TO CLIMATE-AFFECTED NATURAL HAZARDS .....	15
2.10. COMMUNITY CLIMATE CHANGE CHALLENGES .....	16
<b>3. EXTREME AND SEVERE STORMS .....</b>	<b>17</b>
3.1. CLIMATE CHANGE IMPACTS .....	17
3.2. HURRICANES AND TROPICAL STORMS .....	17
3.2.1 <i>Setting and Recent Occurrences</i> .....	17
3.2.2 <i>Existing Capabilities</i> .....	18
3.2.3 <i>Vulnerabilities and Risk Assessment</i> .....	20
3.2.3.1 Hazard Losses .....	20
3.3. TORNADOES AND HIGH WIND EVENTS .....	22
3.3.1 <i>Setting and Recent Occurrences</i> .....	22
3.3.2 <i>Existing Capabilities</i> .....	22
3.3.3 <i>Vulnerabilities and Risk Assessment</i> .....	22
3.3.3.1 Hazard Losses .....	23
3.4. SEVERE WINTER STORMS.....	23
3.4.1 <i>Setting and Recent Occurrences</i> .....	23
3.4.2 <i>Existing Capabilities</i> .....	24
3.4.3 <i>Vulnerabilities and Risk Assessment</i> .....	25
3.4.3.1 Hazard Losses .....	25
<b>4. SEA LEVEL RISE .....</b>	<b>26</b>
4.1. CLIMATE CHANGE IMPACTS .....	26
4.2. COASTAL FLOODING.....	26
4.2.1 <i>Setting and Recent Occurrences</i> .....	26
4.2.2 <i>Existing Capabilities</i> .....	27
4.2.3 <i>Vulnerabilities and Risk Assessment</i> .....	28
4.2.3.1 Hazard Losses .....	32
4.3. SHORELINE CHANGE.....	32
4.3.1 <i>Setting and Recent Occurrences</i> .....	32
4.3.2 <i>Existing Capabilities</i> .....	32
4.3.3 <i>Vulnerabilities and Risk Assessment</i> .....	32
4.3.3.1 Hazard Losses .....	32
<b>5. CHANGING PRECIPITATION .....</b>	<b>33</b>

5.1. CLIMATE CHANGE IMPACTS .....	33
5.2. RIVERINE AND PLUVIAL FLOODS .....	33
5.2.1 <i>Setting and Recent Occurrences</i> .....	33
5.2.2 <i>Existing Capabilities</i> .....	34
5.2.3 <i>Vulnerabilities and Risk Assessment</i> .....	36
5.2.3.1 Hazard Losses .....	40
5.3. DROUGHT .....	40
5.3.1 <i>Setting and Recent Occurrences</i> .....	40
5.3.2 <i>Existing Capabilities</i> .....	41
5.3.3 <i>Vulnerabilities and Risk Assessment</i> .....	41
5.3.3.1 Hazard Losses .....	41
5.4. DAM FAILURE .....	42
5.4.1 <i>Setting and Recent Occurrences</i> .....	42
5.4.2 <i>Existing Capabilities</i> .....	42
5.4.3 <i>Vulnerabilities and Risk Assessment</i> .....	43
5.4.3.1 Hazard Losses .....	44
<b>6. RISING TEMPERATURES .....</b>	<b>46</b>
6.1. CLIMATE CHANGE IMPACTS .....	46
6.2. EXTREME HEAT .....	46
6.2.1 <i>Setting and Recent Occurrences</i> .....	46
6.2.2 <i>Existing Capabilities</i> .....	47
6.2.3 <i>Vulnerabilities and Risk Assessment</i> .....	47
6.2.3.1 Hazard Losses .....	47
6.3. WILDFIRES .....	49
6.3.1 <i>Setting and Recent Occurrences</i> .....	49
6.3.2 <i>Existing Capabilities</i> .....	49
6.3.3 <i>Vulnerabilities and Risk Assessment</i> .....	50
6.3.3.1 Hazard Losses .....	50
<b>7. EARTHQUAKES .....</b>	<b>51</b>
7.1. CLIMATE CHANGE IMPACTS .....	51
7.2. EARTHQUAKES .....	51
7.2.1 <i>Setting and Recent Occurrences</i> .....	51
7.2.2 <i>Existing Capabilities</i> .....	51
7.2.3 <i>Vulnerabilities and Risk Assessment</i> .....	51
7.2.4 <i>Hazard Losses</i> .....	52
<b>8. MITIGATION STRATEGIES AND ACTIONS .....</b>	<b>54</b>
8.1. STATUS OF MITIGATION STRATEGIES AND ACTIONS .....	54
8.2. PRIORITIZATION OF SPECIFIC ACTIONS .....	55

**List of Figures**

FIGURE 4-1 FOUR LOCALIZED SEA LEVEL RISE SCENARIOS FOR CONNECTICUT.....26  
FIGURE 4-2 TOWN OF PRESTON STORM SURGE ZONES.....31  
FIGURE 5-1 TOWN OF PRESTON FEMA SPECIAL FLOOD HAZARD AREAS.....37  
FIGURE 5-2 DAMS REGISTERED WITH DEEP IN THE TOWN OF PRESTON .....45  
FIGURE 6-1 CCVI HEAT VULNERABILITY FOR THE TOWN OF PRESTON.....48

**LIST OF TABLES**

TABLE 2-1 TOWN OF PRESTON LAND COVER .....9  
TABLE 2-2 TOWN OF PRESTON CRITICAL FACILITIES.....13  
TABLE 2-3 TOWN OF PRESTON EXPOSURE ANALYSIS .....15  
TABLE 3-1 HAZUS-MH HURRICANE RELATED ECONOMIC IMPACTS .....20  
TABLE 3-2 HAZUS-MH HURRICANE RELATED BUILDING DAMAGE.....21  
TABLE 3-3 HAZUS-MH HURRICANE RELATED DEBRIS AND SHELTERING NEEDS.....21  
TABLE 4-1 CCVI FLOOD VULNERABILITY FOR THE TOWN OF PRESTON .....29  
TABLE 5-1 ROADS IN THE 1% ANNUAL CHANCE FLOODPLAIN IN THE TOWN OF PRESTON .....38  
TABLE 5-2 STRUCTURES WITHIN THE 1% ANNUAL CHANCE FLOODPLAIN IN THE TOWN OF PRESTON .....39  
TABLE 5-3 SCCOG CRITICAL FACILITIES ASSESSMENT TOWN OF PRESTON SUMMARY .....40  
TABLE 5-4 HAZUS-MH FLOOD RELATED ECONOMIC LOSSES .....40  
TABLE 5-5 DAMS REGISTERED WITH DEEP IN THE TOWN OF PRESTON .....42  
TABLE 6-1 DAILY MAXIMUM TEMPERATURES FROM MAY TO SEPTEMBER SINCE 2017.....46  
TABLE 7-1 HAZUS-MH EARTHQUAKE RELATED ECONOMIC IMPACTS.....53  
TABLE 8-1 TOWN OF PRESTON ACTIONS AND STAPLEE AND PERSISTS SCORES .....56

# 1. Introduction

## 1.1. Purpose of Annex

The planning process for the multi-jurisdiction hazard mitigation plan update commenced in April 2022 and ended in December 2022, spanning a period of nine months. The planning process included 24 jurisdictions (22 municipalities and two tribal governments) with two participating together (Griswold and Jewett City) for a net total of 23 local planning teams represented. For this 4<sup>th</sup> edition of the plan, SCCOG elected to link the planning process to a parallel planning process administered by the Connecticut Institute for Resilience and Climate Adaptation (CIRCA) that is known as “Resilient Connecticut 2.0” (stylized as *Resilient Connecticut*). The *Resilient Connecticut* program is described on CIRCA’s web site at <https://resilientconnecticut.uconn.edu/> and the expansion of the program into southeastern Connecticut is described at <https://circa.uconn.edu/2022/02/23/resilient-connecticut-expands-statewide/>.

The linkage of the two planning processes was advantageous for the following reasons:

- Incorporation of climate change into the hazard mitigation plan update
- Increased interest from the local communities, especially for those interested in developing climate adaptation strategies
- Direct incorporation of climate change vulnerability products developed by CIRCA including the Climate Change Vulnerability Index (CCVI) for flood and extreme heat vulnerabilities
- Direct incorporation of combined sea level rise and coastal flood inundation simulations from CIRCA
- Positioning of the SCCOG jurisdictions for new funding sources in Connecticut such as the new Department of Energy and Environmental Protection (DEEP) Climate Resilience Fund (DCRF)
- Consistency with the Governor’s Council for Climate Change (GC3) outcomes from the 2020-2021 planning process
- Positioning of the actions for incorporation on the State’s “resilience project pipeline” per Executive Order (EO) 21-3 issued at the end of 2021

The planning process commenced for the local communities on April 20, 2022 with a presentation to the SCCOG Board. During this presentation, the consultant and CIRCA described the planning process and the approach for incorporating the *Resilient Connecticut* program into the hazard mitigation plan update, and notified the chief elected officials that invitations to local planning meetings would follow at the end of April. Local planning team meetings commenced on May 23, 2022 and ended on July 8, 2022. Workshops with local coordinators were conducted in July and September 2022, and supplemental meetings with water utilities in the region and specific stakeholders (i.e., Preston Riverwalk) continued through November 2022.

The purpose of this annex document is to provide an update to the hazard risk assessment and capability assessment provided in the previous HMP, and to evaluate potential hazard mitigation measures and prioritize hazard mitigation projects specific to mitigating the effects of hazards on the Town of Preston. Background information and the regional effects of pertinent hazards are discussed in the main body of the Southeastern Connecticut Council of Governments (SCCOG) Multi-Jurisdictional

Hazard Mitigation and Climate Adaptation Plan. Thus, this annex is designed to supplement the information presented in the Multi-Jurisdictional HMCAP with more specific detail for Preston and is not to be considered a standalone document.

## 1.2. Hazard Mitigation and Climate Adaptation Goals

The primary goal of the previous hazard mitigation plan adopted in 2013 and 2018 was to identify risks to hazards and potential mitigation measures for such hazards in order to **reduce the loss of or damage to life, property, infrastructure, and natural, cultural, and economic resources**. This included the reduction of public and private damage costs. Limiting losses of and damage to life and property was also meant to reduce the social, emotional, and economic disruption associated with a natural disaster.

Coinciding with the incorporation of climate adaptation and the alignment of this HMCAP with the *Resilient Connecticut* planning process administered by CIRCA, the five goals of this HMCAP are:

- Ensure that critical facilities are resilient, with special attention to shelters and cooling centers.
- Address risks associated with extreme heat events, especially as they interact with other hazards.
- Reduce flood and erosion risks by reducing vulnerabilities and consequences, even as climate change increases frequency and severity of floods.
- Reduce losses from other hazards.
- Invest in resilient corridors to ensure that people and services are accessible during floods and that development along corridors is resilient over the long term.

## 2. Community Profile

Preston is a rural community in the north-central region of New London County that was settled and incorporated in 1687. The community has since grown to a population of 4,688 as of the 2000 census. Additional growth over the next decade brought the total population of the town to 4,726 as of the 2010 census. The town is approximately 31.7 square miles in area and includes the historic villages of Preston City, Poquetanuck, and Long Society as well as the minor communities of Hallville, Happyland, and Shewville (Preston Plains). The Town is bordered by Lisbon to the north, Griswold to the northeast, North Stonington to the southeast, Ledyard to the south, Montville to the southwest, and Norwich to the west.

Several major transportation corridors traverse the town. Major roads include Route 2, Route 2A, Route 12, Route 164, and Route 165. One rail line belonging to the Providence/Worcester line travels through Happyland along the eastern shore of the Thames River and connects Norwich to Groton. The rail line allows goods to travel between communities throughout southeastern Connecticut and the eastern seaboard.

Major waterways include the Quinebaug River (which drains from Lisbon and Griswold and forms the boundary of Preston with Lisbon to the north), the Shetucket River (which forms part of the boundary between Norwich and Preston), and the Thames River (which forms the boundary between Preston and Montville). Shipping is only conducted on the Thames River due to the presence of dams upstream in Norwich.

### 2.1. Physical Setting

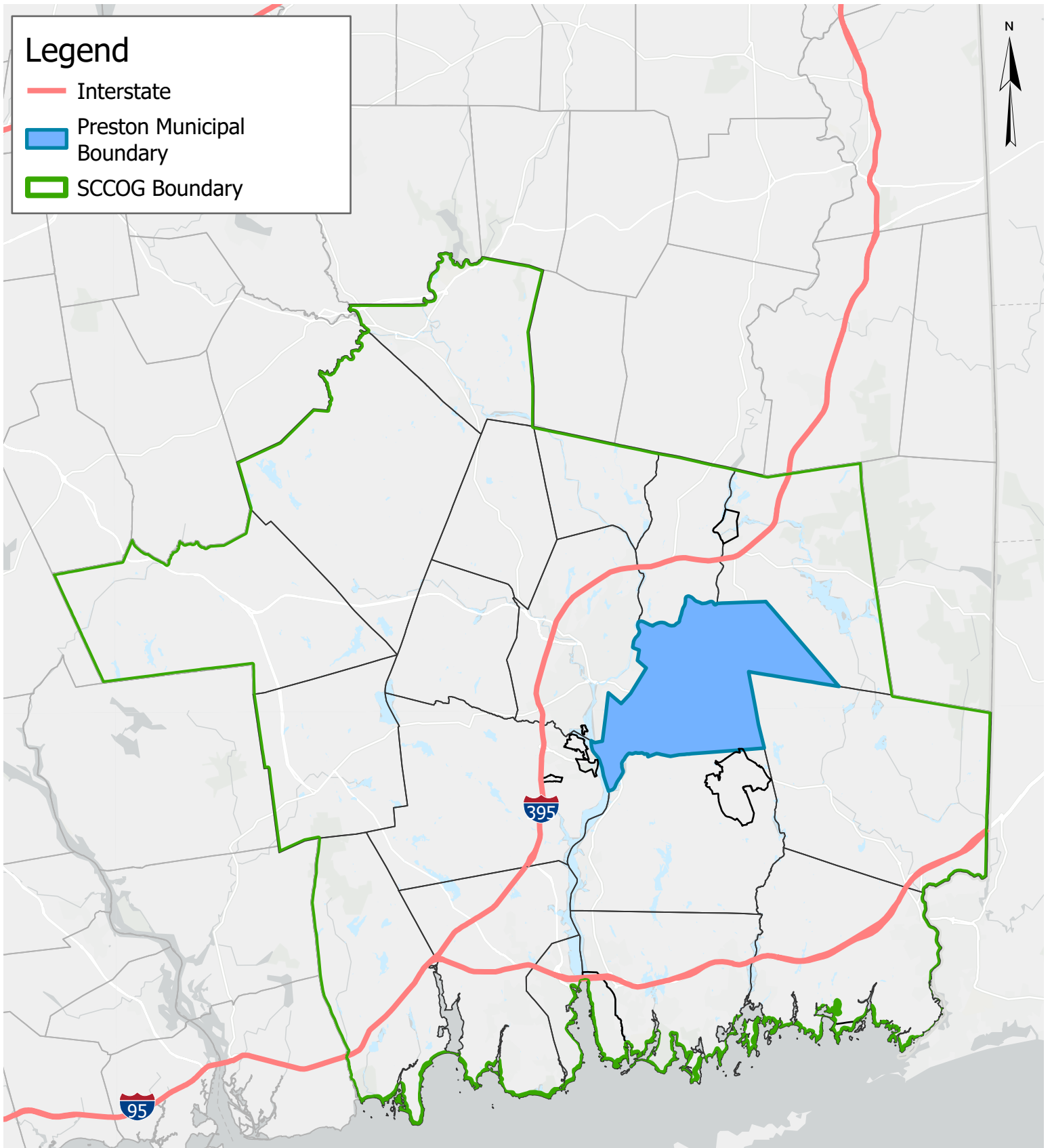
The Town of Preston is located in the north-central section of the SCCOG. Elevations range from approximately sea level along the Thames River and Poquetanuck Cove to just over 530 feet on Lambert Mountain in the southeast corner of the town. Commercial development is located sporadically along the State roads and concentrated in the village districts, with the largest commercial areas being associated with seasonal campgrounds.

Geology is important to the occurrence and relative effects of natural hazards such as earthquakes. Thus, it is important to understand the geologic setting and variation of bedrock and surficial formations in lands underlying Preston.

Preston lies in an area of Connecticut where many fault lines intersect. Several fault lines traverse the town, creating contacts between bedrock formations or denoting areas where the formations have shifted or fractured over time. Many of the faults are unclassified, but some are high angle or thrust faults believed to be Jurassic, Devonian, or Ordovician in origin. The majority of the fault lines trend northwest to southeast, while smaller intersecting faults trend northeast to southwest.

# Legend

- Interstate
- Preston Municipal Boundary
- SCCOG Boundary

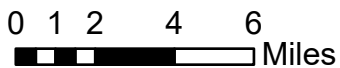


## Regional Location of Preston

SCCOG Hazard Mitigation and Climate Adaptation Plan

Town of Preston

Date: 7/22/2022



Esri, HERE, Garmin, SafeGraph, FAO, METI/NASA, USGS, EPA, NPS



Preston contains several bedrock formations. The majority of the central area of the town is underlain by the Tatnic Hill Formation, while most of the eastern area is underlain by the Quinebaug Formation and its felsic sub-formation. The Happyland area is underlain by west-east bands of the Waterford Group, Hope Valley Alaskite Gneiss, and the Plainfield Formation. These bedrock formations consist primarily of gneiss and schist which are relatively hard metamorphic rocks. The Quinebaug Formation includes intrusions of diorite, and the far eastern area of town is underlain by the Preston Gabbro. These are both relatively hard igneous rocks.

The Town's surficial geologic formations include glacial till and stratified drift. Refer to the Multi-Jurisdictional HMCAP for a generalized view of surficial materials. The majority of the Town is underlain by glacial till. Till contains an unsorted mixture of clay, silt, sand, gravel, and boulders deposited by glaciers as a ground moraine. Areas adjacent to the Quinebaug River, the Shetucket River, the Thames River, Broad Brook, Crowley Brook, Shewville Brook, Hewitt Brook, Poquetanuck Brook, Halsey Brook and Amos Lake have fairly extensive areas underlain by sand, sand and gravel or floodplain alluvium. In addition, several unnamed streams also have fairly significant areas of associated sand and gravel deposits, as do areas west of Preston City and in the vicinity of Swantown Road that are not directly associated with a major water body. The amount of stratified drift present is important as areas of stratified materials are generally coincident with floodplains. These materials were deposited at lower elevations by glacial streams, and these valleys were later inherited by the larger of our present day streams and rivers. However, the smaller glacial till watercourses can also cause flooding. The amount of stratified drift also has bearing on the relative intensity of earthquakes and the likelihood of soil subsidence in areas of fill.

## 2.2. Drainage Basins and Hydrology

All land in the town eventually drains to the Thames River, although approximately half of the town first drains to the Quinebaug River. The northwestern corner of Preston in the vicinity of Long Society drains to the Shetucket River via an unnamed stream. In addition, a few acres of Preston drain to Pachaug Pond in Griswold which eventually drains to the Quinebaug River.

Broad Brook and Choate Brook are the major tributaries of the Quinebaug River in Preston. Ayers Brook, Rattlesnake Brook, Folly Works Brook, and Prentice Brook are all tributaries of Broad Brook in the northeastern section of Preston. Choate Brook in the northern section of Preston is fed by waters from Cedar Swamp and Folwix Brook and impounded by Ayer Pond. The southern section of Preston drains to the Thames River via Poquetanuck Cove which is an estuary of the Thames River. Halsey Brook, Poquetanuck Brook, and Joe Clark Brook (from Ledyard) each drain into the cove. Poquetanuck Brook is formed by the confluence of Myers Brook, and Shewville Brook, has a major tributary in Crowley Brook, and is impounded by Hallville Pond and Gates Pond. Shewville Brook has its headwaters in Shewville and is joined by Indiantown Brook and waters from Cedar Swamp on the Mashantucket Pequot Indian Reservation, as well as Hewitt Brook, before entering Gates Pond. Main Brook is a primary tributary of Indiantown Brook entering from North Stonington.

In addition to the ponds noted above, Amos Lake, the largest lake in the town, is situated near the town center. This lake drains eventually to Indiantown Brook. There are several other ponds and swamps scattered throughout the town including Bates Pond, Cooks Pond, and Avery Pond.

The headwater streams of the Shetucket River are heavily flood controlled such that widespread flooding is no longer an issue along this watercourse. Three significant dams are located on Shetucket River in Norwich at Occum, Taftville, and Greenville, but they do not offer any flood abatement capacities. Similar to the Shetucket River, the upper reaches of the Quinebaug River are also heavily flood controlled such that flooding along this watercourse is also not an issue in Preston.

### 2.3. Land Cover

According to the 2016 1-meter resolution land cover developed by the NOAA Office of Coastal Management, Preston is predominantly comprised of mixed forest, with approximately 59.66% of the town classified as such. The second largest land cover type is cultivated crops, which covers about 7.08%, and next is developed open space which is about 6.53% of land cover. Only about 3.40% of the town is developed impervious land cover. All land covers and their percent coverage can be found in Table 2-1.

Table 2-1 Town of Preston Land Cover

Land Cover Type (2016)	% Coverage
Barren Land	0.52
Cultivated Crops	3.49
Developed, Impervious	3.75
Developed, Open Space	6.35
Estuarine Emergent Wetland	0.11
Estuarine Scrub/Shrub Wetland	< 0.01
Grassland/Herbaceous	3.88
Mixed Forest	61.44
Open Water	2.87
Palustrine Aquatic Bed	0.05
Palustrine Emergent Wetland	0.89
Palustrine Forested Wetland	9.06
Palustrine Scrub/Shrub Wetland	0.36
Pasture Hay	5.93
Scrub/Shrub	1.20
Unconsolidated Shore	0.09

### 2.4. Population, Demographics, and Development Trends

According to the 2014 *Plan of Conservation and Development*, Preston has been a rural community for all of its history. After World War II, the proliferation of the automobile and regional growth spurred Preston to become a bedroom community as the population almost doubled between 1960 and 2000. The *Plan of Conservation and Development* notes that most Preston residents work in Norwich or Groton.

The 2014 *Plan of Conservation and Development* breaks Preston's land use down into 36% undeveloped, 26% agriculture, 26% low and very low density residential, 4% open space with cemeteries, and 2%

medium density residential. The other 6% is divided between industrial, mining/sand and gravel, institutional, transportation, communication and other utility, campgrounds and active recreation.

Several different water utilities provide public water supply to different areas of the town, and sewer service is provided in southwestern Preston by the City of Norwich.

The center of Preston is located approximately in Preston City near the intersection of Routes 165 and 164, close to the North Stonington town line. Preston's historical society and the Preston City Fire Station are located in this area. The town hall and library are located in Shewville near the Ledyard town line. A small area of the Pachaug State Forest and Rose Hill Wildlife Management Area are located in the town. The Preston Community Park, located near the Ledyard town line, is open to residents for recreational use and includes ballfields, walking paths, and a pavilion.

The majority of housing units in Preston are single family homes (90%). Since the last HMP was written in 2017, development has continued to be slow. There have been some small-scale housing and redevelopment projects. Development is primarily occurring along the Route 3 corridor, including the planned "Preston Riverwalk" mixed-use development. The town reports that the project to be on a six to seven year timeline per the agreement in place with the Mohegan Tribe.

Since the previous HMP, the Avalonia Land Conservancy has acquired the Tritown Forest Preserve, which includes 33 acres in Preston on 96 Brand Road.

As of the 2020 Decennial Census, the population for the town is 4,788, which equates to about 132 people per square mile. The 2020 American Community Survey 5-year estimates identified the annual average median income for Preston to be \$87,885, with an average of 24.1% of the population holding a Bachelor's Degree or higher, and an average unemployment rate of 3.2% throughout the town.

Overall, new development and redevelopment in Preston is not increasing risks to natural hazards. Preston Riverwalk is located on elevated ground that is much higher than the Thames River shoreline, and commercial development along Route 2 near the Ledyard town line is outside flood zones. Redevelopment throughout the community offers significant opportunities for flood mitigation to be incorporated into buildings and stormwater management to be addressed on-site; and new development is constructed per the flood damage prevention, wind loading, and snow loading requirements in the State Building Code.

## 2.5. Governmental Structure

Preston is governed by a Town Meeting and Board of Selectmen form of government. The authority of Town officials is granted by Connecticut General Statutes. The Town Meeting is the legislative body of the Town and the Board of Selectmen is responsible for the administration of Town policies. The First Selectman is the chief elected official and is responsible for the day-to-day administration of the Town. The Public Works Department oversees the building and maintenance of all roads including plowing and sanding in the winter and cleanup following wind events. In addition to the First Selectman and the Public Works Department, the Building Department, Planning and Zoning Department, and the Volunteer Fire Department also have an active role in hazard mitigation.

The Town of Preston has several commissions that can take an active role in hazard mitigation, including the Conservation Commission, the Planning and Zoning Commission, and the Zoning Board of Appeals. Departments and commissions common to all municipalities in SCCOG and were described in Section 2.9 of the Multi-Jurisdictional HMCAP. More specific information for the departments and commissions of the Town of Preston is noted below:

- The Building Department reviews plans for new development and significant redevelopment and inspects the work to ensure it meets current building codes. The Town of Preston utilizes the Connecticut Building Code.
- The Inland Wetlands & Watercourses Commission is the Inland Wetlands Regulatory Agency for the Town of Preston and reviews plans for compliance with said regulations and maintain the Town's inland wetlands map.
- The Planning & Zoning Commission reviews land use applications, zoning regulation amendments, planning and development projects, and grant opportunities to ensure that development and growth in the town is consistent with existing land use, environmental policy, and the objectives of the *Plan of Conservation and Development*. They are assisted by the Zoning Enforcement Officer and the Town Planner in the Planning & Zoning Department.
- The Public Works Department consists of a Road Foreman and several staff overseen by the First Selectman. They provide services including safe, efficient and well-maintained infrastructure of roads, bridges, snow removal and deicing on roads; tree and tree limb removal in rights-of-way; and maintain and upgrade storm drainage systems to prevent flooding caused by rainfall. The Road Foreman is also Preston's tree warden.
- The two Volunteer Fire Departments in Preston provide fire suppression, fire prevention, rescue, emergency medical services, and hazardous materials response services to the town. Patients are transported to Backus Hospital in Norwich.
- The Zoning Board of Appeals reviews projects that were denied by the Planning & Zoning Commission or were cited by the Zoning Enforcement Officer, as well as those that require variances.
- The roles of Town departments have not changed since the time of the previous HMP. Thus, the Town of Preston remains technically, financially, and legally capable of implementing mitigation projects for natural hazards to the extent that funding is available.

## 2.6. Review of Existing Plans and Regulations

The Town has several Plans and regulations that suggest or create policies related to hazard mitigation. These policies and regulations are outlined in the Emergency Operations Plan, *Plan of Conservation and Development*, Zoning Regulations, Subdivision Regulations, Inland Wetland Regulations, and the Coastal Management Plan. The Zoning and Subdivision Regulations were both recently updated to incorporate new NFIP requirements.

### Emergency Operations Plan

The Town has an Emergency Operations Plan (EOP) that is updated and certified by the First Selectman annually. This document provides general procedures to be instituted by the First Selectman and/or designee and the Fire Department in case of an emergency. Emergencies can include but are not limited to natural hazard events such as hurricanes and nor'easters as outlined in the Severe Weather Annex of

the EOP. The EOP is directly related to providing emergency services prior to, during, and following a natural hazard event.

#### Plan of Conservation and Development (2014)

The POCD was most recently updated in 2014 with contributions from local boards, commissions, committees, citizens and citizen groups. The Plan seeks to be a statement of policies, goals and standards for the physical and economic development of the Town and recommends the most desirable uses types and population densities in various parts of the municipality.

The 2014 Town of Preston POCD includes the following actions:

- The town regulates activities within 100 feet of a wetland or watercourse. A regulated activity is any action that will likely have an adverse effect on the wetlands and watercourses.
- Town has the objective of meeting the goals of the Coastal Management Act, including protecting wetlands and watercourses.
- The town recognizes the need to ensure that water supplies are adequate by updating its water supply plan.

Therefore, the Preston POCD is considered somewhat consistent with the current goals and actions of the hazard mitigation plan, as it does not directly address several of the hazards such as emergency hazard response, wind damage and winter storm hazards, among others. The next update to the POCD (scheduled for 2024, during the life of the current hazard mitigation plan) will continue to incorporate the elements of the hazard mitigation plan.

#### Zoning Regulations

The Zoning Regulations of the Town of Preston were most recently revised with an effective date of March 18, 2019. The floodplain regulations are associated with the FIS and DFIRM for New London County published in July 2011 and include a variety of preventative regulations pertinent to mitigating flooding hazards. These regulations are applied during the permitting process for new construction and during substantial improvement of existing structures. The regulations meet the minimum requirements required under the NFIP.

In addition to the Special Flood Hazard Area Regulations (Section 13.23), the Zoning Regulations contain several other entries applicable to hazard mitigation. For example, certain types of development such as condominiums and communication towers must locate utilities underground. No new mobile homes are permitted in the town except in areas that have been continuously occupied by a mobile home since the 1960's. All substantial renovations must meet all Connecticut Building Codes for mobile homes, providing an additional level of protection for these structures. In addition, the Zoning Regulations contain the Coastal Area regulations for Preston.

#### Subdivision Regulations

The Subdivision Regulations of the Town of Preston were last updated in August 2012. Several of the design standards are pertinent to hazard mitigation, including encouraging the creation of through streets, avoidance of steep grades for new roads, requiring drainage systems to be designed for at least

a 25-year storm event, and that new facilities and utilities are designed to minimize flood damage. New developments are also required to set aside buildable land as open space.

#### Inland Wetland and Watercourses Regulations

The Inland Wetlands and Watercourses Regulations in the Town of Preston were last amended in July 2015. The regulations require a permit for certain regulated activities which take place within 100 feet of a wetland or watercourse or that may impact a wetland or watercourse. These regulations build on the preventative flood mitigation provided by the Zoning and Subdivision regulations by preventing fill and sedimentation that could lead to increased flood stages.

#### Coastal Area Management Plan

The Town of Preston completed a Coastal Area Management Plan in 1981. The Thames River and Poquetanuck Cove are considered to be estuarine embayments which are protected coastal water bodies that empty into Long Island Sound. Lands located within 1,000 feet of the Thames River and Poquetanuck Cove are considered to be in Connecticut’s Coastal Area Management Zone, and applications for development in this area are subject to an additional level of permitting to demonstrate that there will be no impact to coastal resources.

### 2.7. Critical Facilities, Sheltering Capacity, and Evacuation

The Town of Preston considers several facilities to be critical to ensure that emergencies are addressed while day-to-day management of the Town continues. Critical facilities are presented on figures throughout this annex and summarized in Table 2-2. No critical facilities are located within the 1% annual chance floodplain, except for a small portion of the parking lot at the Public Works garage. In addition, critical facilities are not located in areas that could be impacted by hurricane storm surge. These facilities are described in more detail below.

The Town also considers its commercial properties and the new hotel to be critical facilities as these structures require additional types of assistance during an emergency. The Town further considers its electrical, water, and sewer infrastructure to be critical facilities although this infrastructure is owned and maintained by others.

Table 2-2 Town of Preston Critical Facilities

Facility	Address or Location	Emergency Power	Shelter	Cooling Center	In SFHA
<b>Emergency Services</b>					
Poquetanuck Fire House	87 Route 2A				
Preston City Fire Station*	412 Route 165	✓			
<b>Municipal Facilities</b>					

Preston Plains School	1 Route 164	✓	✓	✓	
Preston Veterans Memorial School	325 Shetucket Turnpike				
Public Works Garage	423 Route 2				✓
Town Hall	389 Route 2				
Transfer Station	108 Ross Road				
<b>Health Care/Senior Living</b>					
Lincoln Park Elderly Housing	Lincoln Park Road Extension				

SCCOG completed an assessment of critical facilities in the region in 2017, fulfilling an action listed in the 2012 edition of the multi-jurisdiction hazard mitigation plan. The Public Works facility in Preston was included. The assessment determined that this facility faces minor current flood risks and will experience increasing flood risk in the future.

Facility	Address	Short-Term (0-20 years)	Long-Term (>20 years)
Preston Public Works	423 Route 2	No action needed	Wet and dry floodproofing

#### Public Works Garage

The Town Public Works garage is located near Preston Plains School. It is used for vehicle and equipment storage and the facility also houses the Town’s salt and sand supply. Only a portion of the parking lot is located in the 1% annual chance floodplain.

#### Town Hall

The Preston Town Hall houses records, plans, and other documents important for administering the Town. It does not have emergency backup power. Two Resident State Troopers operate out of the Town Hall and provide police services to the town.

#### Preston Volunteer Fire Departments

The Preston City Fire Department and the Poquetanuck Fire Department provides fire suppression, rescue, and emergency medical services out of two fire stations located in the respective village areas. The Preston City Fire Station also includes the Town’s Emergency Operations Center and has a generator for emergency power. The Fire Departments and town staff perform emergency services training with local utilities each year.

The Preston EMD maintains a fire prevention program where emergency management and fire staff work together to provide education on fires and fire prevention at schools. This program could easily be expanded to incorporate other hazards.

#### Shelters

Preston Plains School is the Town’s shelter and cooling center, and can hold approximately 100 people. The school has a generator and the shelter is American Red Cross certified. The Town does not have a secondary or backup shelter, although the other school or the fire houses could be used if necessary. In addition to Town departments, the American Red Cross and the Salvation Army provide services related to mitigation and emergency management. The American Red Cross and the Salvation Army help

provide shelter and vital services during disasters and participate in public education activities. If additional space was needed, the Town would send evacuees to a regional American Red Cross shelter.

### Communications

The Town’s communication capability is considered adequate for most circumstances. Emergency communications are good except during long power outages. The Town relies on radios, cellular phones and email for much of its communications. The Town is also part of the CT Alerts “Everbridge” Reverse 9-1-1 system for emergency notification of residents. Typically, Town personnel post notifications on bulletin boards and on the Town website prior to major storms and also utilize local media (newspapers, television, and radio) to pass information during and after storms. Residents can also contact the First Selectman directly with comments related to natural hazards or emergency response.

Communication was difficult during the power outages following Hurricane Irene and Winter Storm Alfred due to downed trees and power outages at the nearby cellular towers. Town personnel made personal contact with residents by going door-to-door during the outage to pass along necessary information.

### Health Care and Senior Living Facilities

The Town’s Housing Authority owns 40 units of Elderly Housing at Lincoln Park in Hallville. Preston does not have any convalescent or nursing homes.

### Evacuation Routes

Preston does not have a published evacuation map; residents utilize State roads or local roads to exit the town. The highest capacity egress routes from Preston include Route 2 into Norwich or Ledyard, Route 2A into Montville, Route 12 into Ledyard or Norwich, Route 164 into Griswold, or Route 165 into Norwich or Griswold.

## 2.8. Repetitive Loss Properties

A repetitive loss (RL) property is defined as any insurable building that has had two or more claims exceeding \$1,000 that were paid by the National Flood Insurance Program (NFIP) within a ten-year period. As of June 2022, the Town of Preston has no RL properties.

## 2.9. Exposure to Climate-Affected Natural Hazards

Properties, people, historic resources, and critical facilities in the Borough are exposed to natural hazards affected by climate change (i.e., severe storms, coastal flooding, droughts) as well as hazards that are not affected by climate change (i.e., earthquakes). As an initial screening of exposure to hazards, areas of risk have been overlaid onto parcel and point data in a GIS to understand the maximum potential exposure to hazards. The results of this analysis are found in Table 2-3.

*Table 2-3 Town of Preston Exposure Analysis*

Hazard	At-Risk Parcels	At-Risk Facilities	At-Risk Historic Assets
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	Value	Number	Value	Number	Value	Number
<b>Hurricane/Tropical Storm</b>	\$364,824,397	2,468	\$11,348,700	6	\$9,834,045	59
<b>Severe Thunderstorm</b>	\$364,824,397	2,468	\$11,348,700	6	\$9,834,045	59
<b>Severe Winter Storm</b>	\$364,824,397	2,468	\$11,348,700	6	\$9,834,045	59
<b>Tornado</b>	\$364,824,397	2,468	\$11,348,700	6	\$9,834,045	59
<b>Drought</b>	\$324,037,379	2,159	\$11,348,700	6	\$6,737,600	50
<b>Flood</b>						
1% Annual Chance	\$87,398,019	467	\$4,277,400	3	\$4,068,245	12
0.2% Annual Chance	\$116,064,975	661	\$4,277,400	3	\$4,200,745	13
<b>Storm Surge</b>						
Category 1	\$22,601,076	83	-	-	\$3,437,500	6
Category 2	\$24,876,786	101	-	-	\$3,437,500	6
Category 3	\$25,454,586	109	-	-	\$3,437,500	6
Category 4	\$26,983,086	122	-	-	\$3,437,500	6
<b>Earthquakes</b>	\$364,824,397	2,468	\$11,348,700	6	\$9,834,045	59
<b>Wildfire</b>	\$270,212,790	1,739	\$11,348,700	6	\$6,737,600	50

### 2.10. Community Climate Change Challenges

As is with all of the SCCOG communities, the Town of Preston has several concerns regarding climate change challenges. Most communities in the region are typically most concerned with the impacts of increased flooding and extreme heat events, however, there are often concerns about other climate driven hazards. The following summary sheet identifies the top flooding, heat, and other climate change concerns for the town, along with the hazard mitigation and climate adaptation actions that will work to address these concerns.

# Climate Change Summary Sheet for Town of Preston

## What are the Town's Top Climate Change Concerns?

**Flooding:** Stormwater-related flooding in the historic village and at the former State Hospital are challenges facing the Town. Minor concerns were expressed regarding flood risks at the public works garage.

**Extreme Heat:** The Town believes that additional cooling center capabilities could benefit vulnerable and elderly populations.

**Others:** Power outages everywhere in Preston are a significant concern for the Town. Severe storms will continue to worsen in frequency and severity.

## Which Hazard Mitigation and Climate Adaptation Actions Will Address Climate Change Concerns?

**Flooding:** Upgrade drainage systems where necessary during improvements along Route 2A; and reduce the potential for stormwater-related erosion and washouts at the Riverwalk site using traditional and green stormwater infrastructure.

**Extreme Heat:** Because Preston Plains Middle School is already the emergency shelter, formalize its use as a cooling center. Ensure that standby power can operate the AC and that transportation options are available to bring seniors and other vulnerable people to the cooling center.

**Others:** Look for opportunities to harden power lines and evaluate the feasibility of a microgrid for facilities such as Public Works and Preston Plains Middle School.

## 3. Extreme and Severe Storms

### 3.1. Climate Change Impacts

Climate change projections indicate varying changes in the frequency and intensity of severe storms and their relative hazards like precipitation and wind. It is expected that as global mean temperatures continue to rise, storms like hurricanes, tropical storms, and severe thunderstorms, may become more frequent and more intense. The degree to which these events might change, and the confidence levels in the models, vary by event type.

Hurricanes and tropical storms are likely to be accompanied by higher wind speeds and an overall increase in intensity. Warm water and air temperatures are essentially the fuel source for the storm, therefore warmer temperatures mean an increase in fuel which can produce more intense winds and high precipitation levels.

While the future behavior of tornado and high wind events is a little more challenging to predict in comparison to hurricanes, it has been noted that the number of days of tornadic activity has decreased in recent decades, though the number of tornadoes in a single day has increased.<sup>1</sup> There is a similar lack in confidence when projecting severe thunderstorm and wind events. Because these events are short-lived and relatively small-scale, monitoring and modeling are more challenging. Overall, however, future climate conditions are likely to become more conducive to the development of such events, therefore increasing the potential for occurrence.

Severe winter storm events, similar to hurricanes, are expected to become more intense under future climate conditions, however they are expected to become less frequent. These storms will continue to be capable of producing large amounts of precipitation, though in future decades this precipitation will consist of less snow and more wintry mix or rain.

These changes in storms could mean an increase in risk throughout town or for specific populations, more severe storm damages and impacts, or an increase in flooding occurrences.

### 3.2. Hurricanes and Tropical Storms

#### 3.2.1 Setting and Recent Occurrences

Several types of hazards may be associated with tropical storms and hurricanes including heavy or tornado winds, heavy rains, and flooding. Flooding hazards are discussed in Section 4.2 and Section 5.2 of this annex. Wind hazards are widespread and can affect any part of the town. However, some buildings in the town are more susceptible to wind damage than others.

Hurricane Irene impacted the region in August 2011. Trees fell throughout the town and the region causing power outages that lasted up to seven days in Preston.

In 2012, Super Storm Sandy, a hybrid storm with both tropical and extra-tropical characteristics, brought high winds and coastal flooding to southern New England. Record breaking high tides and wave action was combined with sustained winds of 40 to 60 mph and wind gusts of 80 to 90 mph. Emergency managers recommended mandatory evacuations of 362,000 people that lived in low lying areas.

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<sup>1</sup> <https://nca2018.globalchange.gov/chapter/2/>

Widespread significant statewide power outages of 667,598 lasted up to 8 days. The town of Preston received over \$10,000 in disaster relief from FEMA to cover the cost of damages from the storm. Town officials describe the event as not being significant in Preston.

On August 2, 2020 Tropical Storm Isaias swept through the State bringing severe winds which resulted in the highest number of outage events Connecticut has ever experienced. With over 620,000 outages reported by Eversource alone, the state's largest electric supplier, residents across the SCCOG region were without power, cable, and internet for extended periods of time. While this storm did not generate typical amounts of rainfall experienced during a tropical storm event, the wind damage exceeded expectations bringing down trees and power lines across the state. The Town of Preston experienced severe tree damage and extensive power outages.

In 2021, four tropical storm events passed through, or within 50 miles of, the state. Some of these events, which are described in more detail below, resulted in flooding along several brooks and stream crossings, including roadway washouts.

The 2021 events included Elsa, Fred, Henri, and Ida.

- July 9, 2021 (T.S. Elsa) – Elsa made landfall as a tropical storm in Florida and traveled along the eastern seaboard. It passed through Southeastern New England bringing high winds and rainfall. Gusts were reported over 40 mph, and residents throughout the region and state were left without power.
- August 19, 2021 (Extratropical Storm Fred) – This tropical event passed north of the state bringing heavy rain to some areas in Connecticut; there was a reported 5.14 inches in West Hartford. Fred also produced an EF-0 tornado in Windham County.
- August 22, 2021 (T.D. Henri) – Hurricane Henri made landfall in Rhode Island as a tropical storm and then traveled northwest across the State of Connecticut. While the impacts for Henri were projected to be more severe than they actually were, the storm did result in heavy rainfall and thousands of power outages.
- September 1, 2021 (Extratropical Storm Ida) – Though Hurricane Ida made landfall in Louisiana as a category 1, the storm moved south of Long Island as an extratropical storm and is reported to be costliest storm even since Super Storm Sandy a decade earlier. Ida caused major flooding across Connecticut and the Southeastern Region. For the first time, a statewide flash flood warning was issued. Several communities in the state, including the City of Norwich, warned residents to have minimal contact with surface waters due to the discharge of untreated sewage. There were reports of 7 to 8 inches of rainfall in the Southeastern Region, and as high as 8.58 inches in Uncasville. Several washouts occurred in Town including at the former State Hospital where the future Preston Riverwalk is to be developed.

### 3.2.2 Existing Capabilities

Wind loading requirements are addressed through the state building code. The Connecticut State Building Code was most recently adopted with an effective date of October 1, 2022. The code specifies the design wind speed for construction in all the Connecticut municipalities. The basic design wind speed for Preston ranges from 120 to 140 miles per hour and the ultimate design wind speed is 125 miles per hour; design speeds used varies depending on the building use (for example, hospitals must be

designed to the higher wind speed). Note that changes in design wind speed figures since the previous HMP are largely the result of a shift from “nominal” to “ultimate” wind speeds, for compatibility purposes; see the Connecticut Building Code or the American Society of Civil Engineers website for more information. Preston has adopted the Connecticut Building Code as its building code. The Town makes information on wind-resistant construction techniques available to all building permit applicants.

Parts of trees (limbs) or entire tall and older trees may fall during heavy wind events, potentially damaging structures, utility lines, and vehicles. The Road Foreman in the Public Works Department is also the Town’s tree warden who can post notification and schedule tree removal. The Public Works staff also monitors trees as part of their normal rounds, performs informal inspections for the tree warden, and has a small budget for minor tree maintenance. The Town hires outside contractors for larger jobs and those near power lines.

The Town does not collect debris after storm events; however, it opens the Public Works Garage and provides for people to deliver debris they collect on their own to that site. This designated brush disposal location has been sufficient for the volume of debris created by events up to this point.

In response to the major power-outages caused by Tropical Storm Irene and Super Storm Sandy, as well as significant winter storm events, Eversource has taken an aggressive approach to tree maintenance and has improved communication and coordination with municipalities. Municipal staff report that Eversource has enhanced its tree clearing efforts, has updated its facilities, and has been working to strengthen the power grid and build in redundancies. Communication and coordination has improved due to Eversource’s liaison program.

Certain types of new development such as condominiums and communication towers are required to place utilities underground in order to mitigate storm-related damages. Placing utilities underground is also encouraged for other new developments. Utility lines are located underground in only a few areas of the town.

Warning is one of the best ways to prevent damage from hurricanes and tropical storms, as these storms often are tracked well in advance of reaching Connecticut. The Town can access National Weather Service forecasts via the internet as well as listen to local media outlets (television, radio) to receive information about the relative strength of the approaching storm. This information allows the Town to activate its EOP and encourage residents to take protective or evacuation measures if appropriate.

Prior to severe storm events, the Town ensures that warning/notification systems and communication equipment are working properly and prepares for the possible evacuation of impacted areas. Residents can sign up to receive warnings from the statewide CT “Everbridge” Reverse 9-1-1 system to receive critical information. Although hurricanes that have impacted Preston have historically passed in a day’s time, additional regional shelters could be outfitted following a storm with the assistance of the American Red Cross on an as-needed basis for long-term evacuees.

Summary

In general, municipal capabilities to mitigate hurricane damage have not increased significantly since the 2017 edition of the hazard mitigation plan was adopted. This is likely because the Town increased its capabilities in response to the damage from Tropical Storm Irene in 2011 and Super Storm Sandy in 2012 and continue to operate at this level.

### 3.2.3 Vulnerabilities and Risk Assessment

The entire Town is vulnerable to hurricane and tropical storm wind damage and from any tornadoes (Section 3.3) accompanying the storm, as well as inland and coastal flooding (Section 5.1 and Section 4.2). Of particular concern are the blockage of roads and the damage to the electrical power supply from falling trees and tree limbs. The Town had extensive outages in some areas because of tree damage to utility lines following Hurricane Irene in August 2011 and Tropical Storm Isaias in 2020.

Direct wind damage to newer buildings from hurricane or tropical storm-level winds is rare in the Town since the new buildings were constructed to meet or exceed current building codes. Many buildings in the Town are historic and many were built prior to the 1970s and do not meet current building codes. Older buildings in the Town, mobile homes, and camp trailers at the large campgrounds are particularly susceptible to roof and window damage from high wind events. This risk to structures will be reduced with time as these buildings and trailers are remodeled or replaced with structures that meet current codes.

The strength of a large hurricane could cause a moderate economic impact to the town. The potential economic effect of wind damage to SCCOG was evaluated in the Multi-Jurisdictional HMP. A separate analysis was not performed specifically for Preston.

#### 3.2.3.1 Hazard Losses

The Town of Preston did not receive FEMA PA funds in the wake of Tropical Storm Isaias. Since 2012, the town has received \$10,810 in FEMA PA funds for project costs of \$14,414. This was all received for Super Storm Sandy. These funds were received for debris removal and donated resources. The Town reportedly submitted for FEMA funds in the wake of the 2021 storm events.

In addition to PA, FEMA also offers Individual Assistance (IA) to property owners and renters after a declared disaster. In the wake of Hurricane Ida, one property owner received \$3,443 in IA funds.

FEMA HAZUS-MH 6.0 was used to develop losses associated with seven probabilistic hurricane scenarios from the 10 year to 1,000 year return period. Losses include economic loss, building damages, debris, and sheltering needs. Table 3-1 through Table 3-3 presents hurricane related damages for the Town of Preston. Additional HAZUS-generated losses for the town and region can be found in the Multi-Jurisdictional document.

Downscaled tropical storm losses based on the 2019 Connecticut Natural Hazard Mitigation Plan are developed in the Multi-Jurisdictional document.

*Table 3-1 HAZUS-MH Hurricane Related Economic Impacts*

Preston	Return Period	Residential	Commercial	Industrial	Others	Total
	10-year	\$64,370	\$0	\$0	\$0	\$64,370

	20-year	\$1,219,360	\$25,420	\$6,250	\$8,640	\$1,259,670
	50-year	\$5,734,650	\$296,540	\$44,300	\$90,080	\$6,165,570
	100-year	\$11,223,500	\$989,050	\$172,670	\$387,110	\$12,772,330
	200-year	\$20,786,260	\$2,383,970	\$500,850	\$1,006,570	\$24,677,650
	500-year	\$42,085,250	\$5,377,740	\$1,388,470	\$2,143,590	\$50,995,050
	1,000-year	\$62,650,560	\$8,322,110	\$2,242,770	\$3,113,210	\$76,328,650

Table 3-2 HAZUS-MH Hurricane Related Building Damage

Preston	Return Period	Minor	Moderate	Severe	Destruction	Total
	10-year	1	0	0	0	1
	20-year	7	0	0	0	7
	50-year	103	7	0	0	110
	100-year	252	28	1	1	282
	200-year	422	72	6	3	503
	500-year	619	161	23	11	814
	1,000-year	710	229	42	22	1,003

Table 3-3 HAZUS-MH Hurricane Related Debris and Sheltering Needs

Preston	Return Period	Debris Generated (Tons)	Households Displaced	Individuals Seeking Temporary Shelter
	10-year	3	0	0
	20-year	142	0	0
	50-year	1,176	0	0
	100-year	1,981	0	0
	200-year	3,425	1	0
	500-year	6,321	7	2
	1,000-year	8,787	19	6

### 3.3. Tornadoes and High Wind Events

#### 3.3.1 Setting and Recent Occurrences

Similar to hurricanes and winter storms, wind damage associated with summer storms and tornadoes has the potential to affect any area of the town. Furthermore, because these types of storms and the hazards that result (flash flooding, wind, hail, and lightning) might have limited geographic extent, it is possible for a summer storm to harm one area within the town without harming another. Such storms occur in the town each year, although hail and direct lightning strikes to the town are rarer. For example, the NCDC reported that a severe thunderstorm on July 2, 2008 produced hail and heavy winds that knocked down two trees and wires on River Road. More recently, NCDC reported a severe thunderstorm and wind event that brought down trees and power lines on Hillcrest Avenue. No tornadoes have occurred in the town since the last HMP.

Other recent severe storm events in the region include:

- On September 6, 2017 a cold front triggered severe storms in county and caused tree damage in multiple communities in the region. Colchester reported trees and wires down, and the Groton-New London Airport measured sustained winds at 44 mph and gusts of 56 mph.
- On April 13, 2020 a low pressure system resulted in high winds throughout New London County.
- On November 13, 2021 a tornado touched down southeast of town in Pawcatuck, and another northeast of town in Plainfield. There were reports of uplifted trampolines, downed trees and powerlines, and an uplifted metal shed. This same storm also caused damage in other surrounding communities.

#### 3.3.2 Existing Capabilities

Warning is the most viable and therefore the primary method of existing mitigation for tornadoes and thunderstorm-related hazards. The NOAA National Weather Service issues watches and warnings when severe weather is likely to develop or has developed, respectively. The Town can access National Weather Service forecasts via the internet as well as listen to local media outlets (television, radio) to receive information about the relative strength of the approaching storm. This information allows the Town to activate its EOP and encourage residents to take protective measures if appropriate.

Aside from warnings, several other methods of mitigation for wind damage are employed by the Town as explained in Section 3.2.2 within the context of hurricanes and tropical storms. In addition, the Connecticut Building Code includes guidelines for the proper grounding of buildings and electrical boxes to protect against lightning damage.

#### Summary

In general, municipal capabilities to mitigate thunderstorm and tornado damage have not increased significantly since the 2017 edition of the hazard mitigation plan was adopted, other than those changes listed in section 3.2.2.

#### 3.3.3 Vulnerabilities and Risk Assessment

Summer storms are expected to occur each year and are expected to at times produce heavy winds, heavy rainfall, lightning, and hail. All areas of the town are equally likely to experience the effects of summer storms. The density of damage is expected to be greater near the more densely populated



villages in town, and at campgrounds which have trailers and tents that are more vulnerable to summer storm damage than other structures.

Most thunderstorm damage is caused by straight-line winds exceeding 100 mph. Experience has generally shown that wind in excess of 50 miles per hour (mph) will cause significant tree damage during the summer season as the effects of wind on trees is exacerbated when the trees are in full leaf. The damage to buildings and overhead utilities due to downed trees has historically been the biggest problem associated with wind storms. Heavy winds can take down trees near power lines, leading to the start and spread of fires. Such fires can be extremely dangerous during the summer months during dry and drought conditions. Fortunately, most fires are quickly extinguished due to the town's strong fire response.

Lightning and hail are generally associated with severe thunderstorms and can produce damaging effects. All areas of the town are equally susceptible to damage from lightning and hail, although lightning damage is typically mitigated by warnings and proper grounding of buildings and equipment. Hail is primarily mitigated by warning, although vehicles and watercraft can often not be secured prior to the relatively sudden onset of a hailstorm. Lightning and hail are considered likely events each year, but typically cause limited damage in the town. Older buildings and mobile homes are most susceptible to lightning and hail damage since many were constructed prior to current building codes.

Although tornadoes pose a threat to all areas of Connecticut, their occurrence is least frequent in New London County as compared with the rest of the State. Thus, while the possibility of a tornado striking the town exists, it is considered to be an event with a very low probability of occurrence.

#### *3.3.3.1 Hazard Losses*

Since 2017, there has been one NOAA report event associated with a severe thunderstorm and wind event. This event resulted in \$3,000 in reported damages. Downscaled losses based on the 2019 Connecticut Natural Hazard Mitigation Plan are developed in the Multi-Jurisdictional document.

### 3.4. Severe Winter Storms

#### 3.4.1 Setting and Recent Occurrences

Similar to hurricanes and summer storms, winter storms have the potential to affect any area of the town. However, unlike summer storms, winter storms and the hazards that result (wind, snow, and ice) have more widespread geographic extent. In general, winter storms are considered highly likely to occur each year (major storms are less frequent), and the hazards that result (nor'easter winds, snow, and blizzard conditions) can potentially have a significant effect over a large area of the town.

Severe winter storms and nor'easters reported in the previous HMP include:

- The winter of 2010-2011 produced significant snowfall in Preston. The Town checked all flat-roofed buildings and shoveled the schools and the fire departments as they have flat roofs. Many residents also cleared their own roofs or hired contractors. The Building Department inspected a few homes per resident request but found no structures in danger. There were no reported failures on private property.
- Winter Storm Alfred in late October 2011 caused minor to moderate tree damage, with power outages lasting up to two days.

- 2013 featured exceptional snow events that severely taxed snow removal abilities of towns in the region. The blizzard of 2013 in early February dumped 1-2 feet of snow on the region. Another snowstorm struck the region in mid-March 2013 dumping upwards of 1-2 feet of snow in some parts of the county. Although New London country escaped the 3 foot and higher totals of some areas in the mid-Atlantic, the vast quantity of snow was still a major disruption to the town.

The year 2013 featured exceptional snow events that severely taxed snow removal abilities of towns in the region. The blizzard of 2013 in early February dumped one to two feet of snow on the region. Another snowstorm struck the region in mid-March, 2013 dumping upwards of one to two feet of snow in some parts of the county. The public assistance reimbursement for the February 2013 storm was \$29,919.39.

Some of the more recent significant events include:

- A heavy storm came through the region on February 9, 2017 bringing blizzard conditions and heavy snowfall. The Town of Colchester reported 14.5 inches of snow, and 13 inches were reported along the coast in Groton.
- A late winter storm on March 12, 2018 resulted in 23 inches of snowfall in Oakdale, with reports of one to two feet in other parts of Northern New London County. The southern part of the region experienced 10 to 18 inches of snow, and strong wind gusts. There were also reports of downed trees throughout the region as a result of this storm.
- On January 28, 2022 the region was hit with a heavy snowstorm and blizzard like conditions. Parts of the region reported up to 22 inches of snowfall, and gusts up to 65 mph. There were also several hours of less than ¼ mile visibility. Snow drifts were also reported to be a challenge, with some areas experiencing drifts up to three and a half feet deep.

### 3.4.2 Existing Capabilities

Existing programs applicable to winter storm winds are the same as those discussed in Sections 3.2.2 and 3.3.2. Programs that are specific to winter storms are generally those related to preparing plows and sand and salt trucks; tree trimming and maintenance to protect power lines, roads, and structures; and other associated snow removal and response preparations. Town officials report that winter storm mitigation capabilities have improved significantly since the major storms of 2011 and 2013.

As it is almost guaranteed that winter storms will occur annually in Connecticut, it is important to locally budget fiscal resources toward snow management. Snow is the most common natural hazard requiring additional overtime effort from Town staff, as parking lots and roadways need constant maintenance during storms. The Public Works Department oversees snow removal in the Town and stores salt and sand at the Public Works Garage. The Town has established plowing routes that prioritize access to and from critical facilities. The Town has two private companies on call for assistance during larger events. The Connecticut Department of Transportation (DOT) plows State roads. As a Connecticut DOT garage is located in Preston, plowing is generally timely.

The Public Works Department monitors areas of Town that may become difficult to access during winter storm events. Plows are sent out ahead of ambulances and school buses when necessary.

The Connecticut Building Code specifies that a pressure of 30 pounds per square foot be used as the base “ground snow load” for computing snow loading for roofs. The Town monitors the roofs of municipal buildings when snow loads accumulate and shovel if necessary, and many residents and businesses also shovel or plow their roofs. School officials are responsible for monitoring their own roofs, and will contact the Town when removal is necessary. Occasionally the Town will assist residents with snow removal. Overall, there are not many flat roofs in Preston, and snow load on roofs has not historically been an issue.

The Town distributes a local Town Newsletter on a quarterly basis; information for protecting Town residents during cold weather, and for mitigating icing and insulating pipes at residents, is included in this Newsletter prior to the winter months.

### Summary

In general, municipal capabilities to mitigate snowstorm damage have not increased significantly since the 2017 edition of the hazard mitigation plan was adopted. This is because the Town increased capabilities sharply following the 2011 and 2013 events and continues to operate at this higher level. This is because the Town worked to improve capabilities following the major storms of 2011 and 2013.

### 3.4.3 Vulnerabilities and Risk Assessment

Severe winter storms can produce an array of hazardous weather conditions, including heavy snow, blizzards, freezing rain and ice pellets, flooding, heavy winds, and extreme cold. Further "flood" damage could be caused by flooding from frozen water pipes. Often, tree limbs on roadways are not suited to withstand high wind and snow or ice loads.

This section focuses on those effects commonly associated with winter storms, including those from blizzards, ice storms, heavy snow, freezing rain, and extreme cold. Warning and education can prevent most injuries from winter storms. Most deaths from winter storms are indirectly related to the storm, such as from traffic accidents on icy roads and hypothermia from prolonged exposure to cold. Damage to trees and tree limbs and the resultant downing of utility cables are a common effect of these types of events. Secondary effects can include loss of power and heat.

The majority of buildings in Preston were constructed within the past several decades and therefore not particularly susceptible to damage from heavy snow. While some Town buildings could be susceptible to heavy snow loads, they will be cleared quickly if safety is a concern. For example, both schools and both fire stations have flat roofs which make them more susceptible to snow load damage.

Icing is not a significant issue in the Town. In general, there are few steep slopes such that extra sanding and salting of the roadways in necessary locations alleviates any trouble spots. In addition, there are no issues with ice jams on any of the streams in the town. Town officials further note that no areas of town are difficult to access in the winter.

#### 3.4.3.1 Hazard Losses

There have been no reported winter storm losses for the Town of Preston since 2017. In the past decade, Preston has received FEMA PA funds in the amount of \$38,467 for winter storms in 2013 and 2015. Downscaled losses based on the 2019 Connecticut Natural Hazard Mitigation Plan are developed in the Multi-Jurisdictional document.

## 4. Sea Level Rise

### 4.1. Climate Change Impacts

Sea levels are rising at an increased rate across the globe. These rising waters are attributed to melting glaciers and ice sheets, as well as thermal expansion from warming ocean waters. Global sea level rise takes into account the major causes of rise, and the averages of rise around the world. Local sea level rise estimates consider the global changes, in addition to what is happening more locally such as changes in currents or land subsidence.

The University of Connecticut, Connecticut Institute for Resilience and Climate Adaptation (CIRCA) has, in accordance with state statute, developed local sea level rise projections for communities to use as a planning threshold (Figure 4-1). CIRCA recommends that communities plan for 0.5 meter (1.64 feet) of sea level rise above 2001 levels by 2050. CIRCA intends to revisit this estimate and update the planning thresholds in the lifespan of this plan (2023-2028).

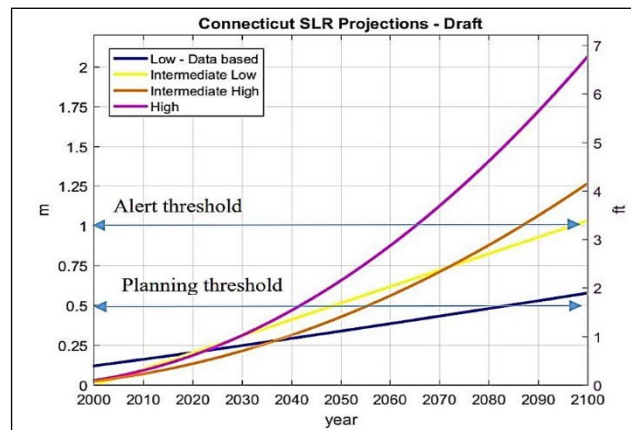


Figure 4-1 Four Localized Sea Level Rise Scenarios for

Even though sea level rise occurs over a longer time period than other hazards, coastal communities are becoming increasingly concerned with the cascading impacts. Increased sea levels can cause a greater geographic reach for coastal flooding events, an increase in frequency or extent of “sunny day” flooding, an increase in storm surge extent, and saltwater inundation along the shoreline. All of these impacts can damage properties, deteriorate infrastructure, cause access and egress challenges, and exacerbate coastal erosion processes.

### 4.2. Coastal Flooding

#### 4.2.1 Setting and Recent Occurrences

Despite being located well-inland from the Connecticut shoreline, the Town of Preston has coastal resource areas that are tidally influenced. The coastal area of Preston consists of nearly 5.4 miles of riverfront associated with the Thames River and Poquetanuck Cove. The shoreline of Preston contains estuarine embayments (defined as a protected coastal water body with a direct connection to Long Island Sound) along both of these water bodies.

Homes and businesses are located in close proximity to the shorefront along the coastal area. However, the town’s location near the headwaters of the Thames River places many properties at higher elevations than low-lying areas adjacent to Long Island Sound. As such, the town does not typically experience coastal flooding, and only a few areas are at risk of coastal storm surge from hurricanes.

While coastal flooding is relatively infrequent in the town, hurricanes and tropical storms have the potential to induce coastal flooding and storm surge that can impact structures. In 2012, Super Storm Sandy, a hybrid storm with both tropical and extra-tropical characteristics, brought high winds and coastal flooding to southern New England. Record breaking high tides and wave action was combined

with sustained winds of 40 to 60 mph and wind gusts of 80 to 90 mph. Widespread significant statewide power outages of 667,598 lasted up to 8 days. Preston saw minor flooding along the Thames River.

The Town is concerned with the potential long-term effects of sea level rise and its potential to exacerbate coastal flooding conditions in the future. Though Preston has experienced coastal storms in recent years, few major coastal flooding events have occurred in the last five to ten years. However, a significant coastal flood event occurred on December 23, 2022 during the final stages of the planning process for this document. The coastal water surface elevation at the New London tide gauge was reportedly the sixth highest on record. Numerous roads and structures experienced flooding in coastal southeastern Connecticut, and Preston was fortunate to be mostly spared despite its Thames River shoreline.

#### 4.2.2 Existing Capabilities

The Town primarily attempts to mitigate coastal flood damage and flood hazards by controlling and restricting activities in areas of flood risk and the coastal management area, encouraging the elevation of homes and roadways, maintaining hard structures in good condition, and providing signage and warning systems.

The Town utilizes the 1% annual chance floodplains delineated by FEMA. These consist of the 1% annual chance floodplain with elevations (Zone AE) including floodway areas. As noted by the Zoning Regulations, building activities in the floodplain are restricted and new construction or substantial redevelopment must prove that the lowest horizontal member of the new construction will be above the base flood elevation. In addition, the Town requires the submission of a coastal site plan for any project located within the coastal area management boundary.

The shoreline of Preston contains many coastal flood control structures. Small, private bulkheads can be found in Happyland residential neighborhoods along Poquetanuck Cove. Larger structures such as the Mohegan Dike are also located on the Thames River and provide a modicum of shoreline protection. In addition, the railroad embankment at the entrance to Poquetanuck Cove provides a slight delay in floodwaters entering (and draining from) Poquetanuck Cove.

Like many communities, the Town lacks existing policies and mitigation measures that are specifically designed to address sea level rise. Although the Preston does not currently have a specific plan to address sea level rise, important pieces are in place in the form of the codes and regulations cited in this plan, which have been enacted to minimize storm, erosion, and flood damage to structures, such as requiring that new buildings located in the floodplain are located above the base flood elevation.

Preston recently applied for a Local Transportation Capital Improvement Program (LOTICIP) grant for the historic village area along Route 2A. While most of this historic area is outside of the floodplain, there are some low areas along parts of Route 2A that experience challenges with stormwater, and could potentially see future challenges with tidal flooding.

#### Summary

Municipal capabilities to mitigate coastal flood damage have not increased significantly since the 2017 edition of the hazard mitigation plan was adopted. This is because the Town has a limited amount of

land that is affected by coastal hazards, and much of that land is not densely developed, so coastal flood risks are low.

#### 4.2.3 Vulnerabilities and Risk Assessment

This section discusses specific areas at risk to coastal flooding within the town. This flooding can be the result of astronomical high tides, hurricanes, nor'easters, or storm surge. As noted above in the historic record, coastal flooding typically only occurs due to storm surge. Refer to Figure 4-2 for a depiction of areas susceptible to storm surge.

UConn CIRCA has developed a tool to aid in understanding flood vulnerability for communities across the state. This tool, known as the Climate Change Vulnerability Index (CCVI), is comprised of dozens of factors that contribute to a community's flood sensitivity, exposure, adaptive capacity, and ultimately the overall flood vulnerability. The CCVI has been used as a tool to characterize flood vulnerability for Stonington. The distribution of flood vulnerability throughout the community can be seen in Table 4-1. The CCVI demonstrates that flood vulnerability in the town ranges from low to high. Most of the high vulnerability scores are due to coastal flood exposure at Poquetanuck Cove, although high scores are also mapped along the Quinebaug River.

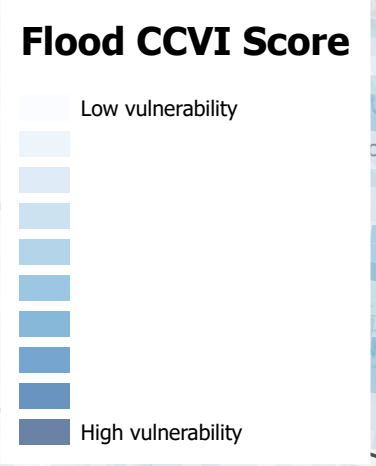
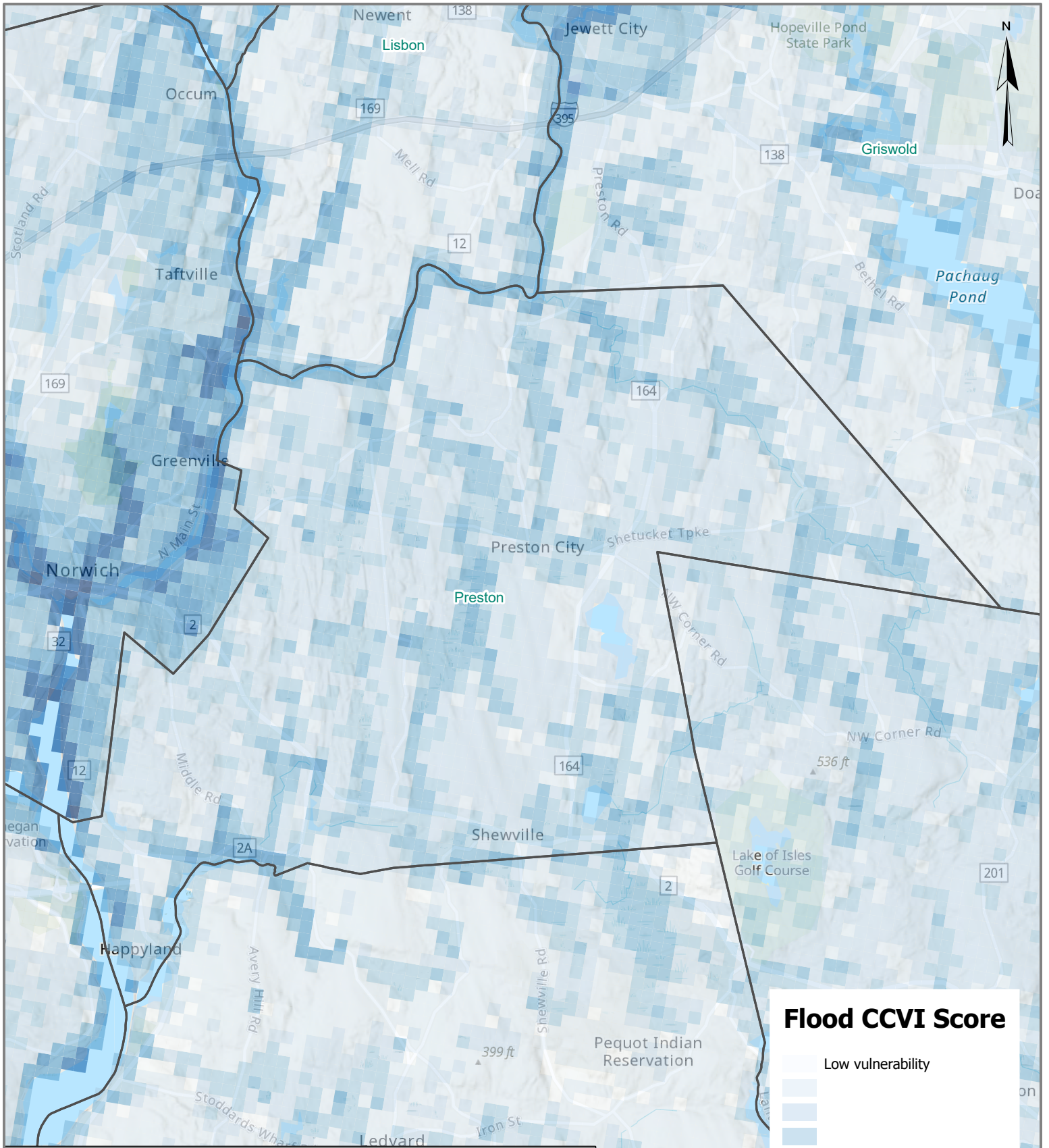
#### Vulnerability Analysis of Areas along Coastal Waters

The area potentially flooded by storm surge approximates the area of the 1% annual chance floodplain. In general, the coastal area affected by storm surge is limited to areas immediately within and adjacent to the Thames River, Poquetanuck Cove, and the lower reaches of Halsey Brook. Due to the similarity of the areas, it may be difficult for Town officials to judge whether an area is being affected by inland flooding or coastal storm surge during a particularly heavy rainfall associated with a hurricane or nor'easter.

Based on the FEMA mapping, low-lying areas adjacent to the Thames River will be affected by storm surge. Homes on Kendall Road and Drawbridge Road could be affected by storm surge from a Category Two hurricane, with additional homes affected by stronger storms. Up to eight homes could be affected by storm surge from a Category Four hurricane. Just inland from the Thames River, up to 12 homes could be affected by storm surge along Route 12 and on Cove Road.

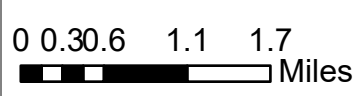
As noted in Section 5.2, the area of Route 2A in the vicinity of Poquetanuck Cove is at risk of flooding with several structures located in the 1% annual chance floodplain. Storm surge from a Category Two hurricane approximates the 1% annual chance floodplain in this area, while storm surge from a Category Three hurricane approximates the 0.2% annual chance floodplain. Storm surge from a Category Four would reach even higher than the 0.2% annual chance floodplain. A business and seven homes could be affected by storm surge along Route 2A near Harris Fuller Road, while an additional 16 could be affected east of Halsey Brook. A business near the southern terminus of Middle Road could also be affected. Fortunately, there do not appear to be any structures located in storm surge areas upstream of Route 2A along Halsey Brook. The Route 2A area continues to be a location of concern for the Town.

In general, it is assumed that as sea level rises, the frequency and magnitude of coastal flooding in the town will increase, with structures and roadways closest to existing sea level being affected more quickly. Areas adjacent to Poquetanuck Cove are likely to be affected first.



**Flood CCVI Score**

SCCOG Hazard Mitigation and Climate Adaptation Plan  
 Town of Preston  
 1/17/2023



Esri, NASA, NGA, USGS, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS,

### Vulnerability Analysis of Private Properties

The coastal areas of the Town of Preston have properties that are inhabited year-round. This intensifies risk to life and property in coastal areas. Waterfront properties are very susceptible to damage from storm surge although FEMA has not established any coastal velocity zones in Preston. Shoreline erosion is a relatively minor concern for private property owners at this point in time since coastal flooding is very infrequent.

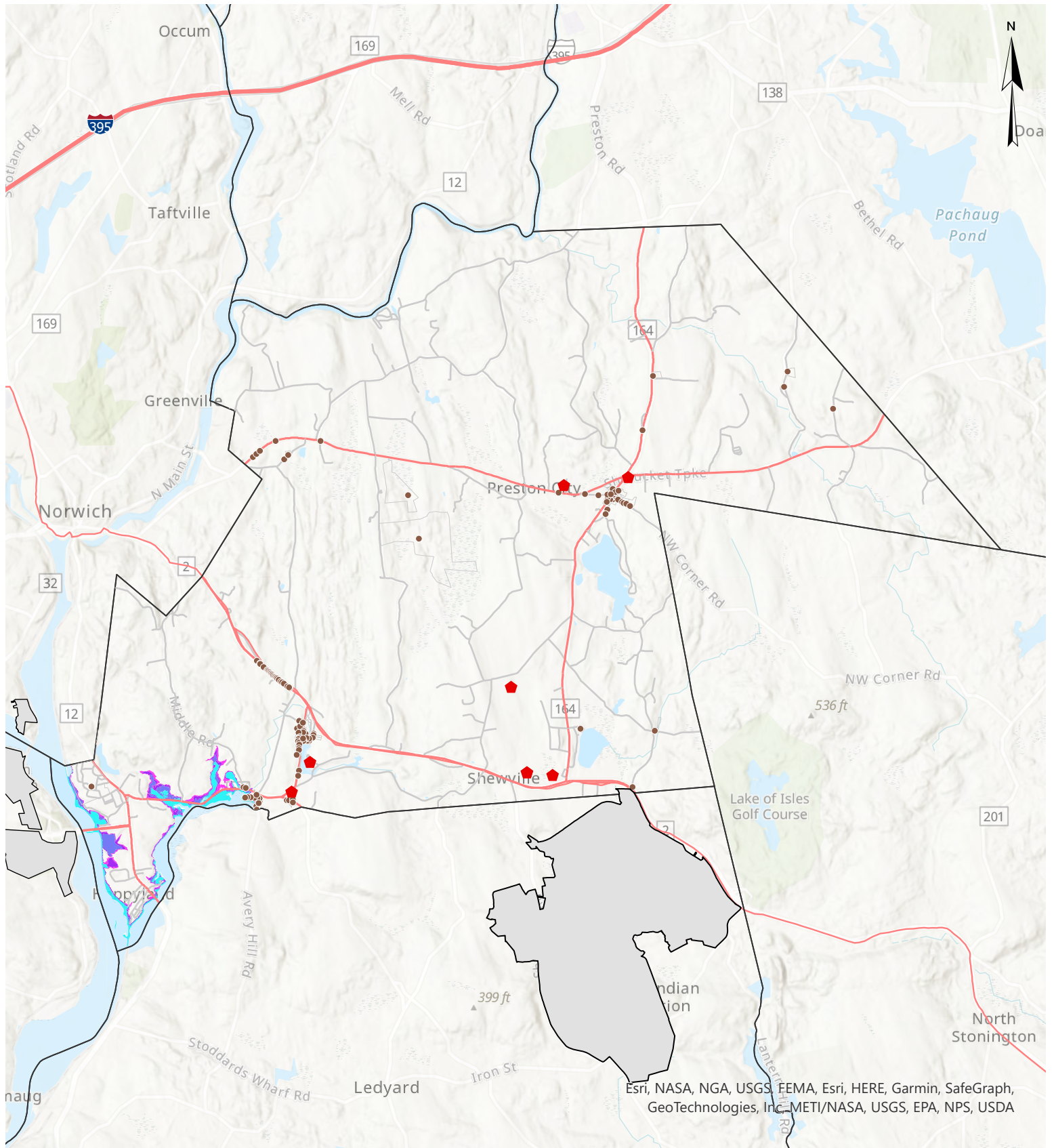
Buildings located in flood hazard areas are primarily residential with some businesses as noted in Section 5.2.3. Most of the structures that are threatened by coastal flooding are also located within the 1% annual chance floodplain, although some are located within the 0.2% annual chance floodplain or even at higher elevations.

Preston has no formalized program currently in place to identify the location or the number of structures that are susceptible to flooding. Such information would be valuable in directing hazard mitigation efforts to locations with the greatest risk. Town planners should use the recently released FEMA storm surge mapping to identify the structures in the town that are at risk for storm surge. This could provide a list of areas to inspect following a storm event and allow for the Town to track building permits from repairs following a natural hazard. This information, in turn, would provide supporting data for future grant applications.

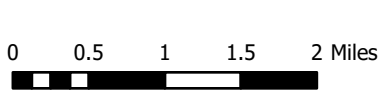
### Vulnerability Analysis of Critical Facilities

As shown on Figure 4-2, critical facilities are not located in coastal storm surge areas and therefore are not considered susceptible to coastal flooding. However, sections of Route 2A could be susceptible to the effects of storm surge. This could lengthen emergency response times due to detours around this area.





**Hurricane Storm Surge Inundation Areas**  
 SCCOG Hazard Mitigation and Climate Adaptation Plan  
 Town of Preston  
 Date: 8/3/2022



**Legend**

- Historic Resources
- ◆ Critical Facilities

**Hurricane Category**

- 1
- 2
- 3
- 4

Esri, NASA, NGA, USGS, FEMA, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, USDA

#### 4.2.3.1 Hazard Losses

There are no reported losses for the Town of Preston related to coastal flooding. HAZUS-generated loss estimates for floods and downscaled flood losses based on the 2019 Connecticut Natural Hazard Mitigation Plan are developed in the Multi-Jurisdictional document.

### 4.3. Shoreline Change

#### 4.3.1 Setting and Recent Occurrences

Shoreline change is primarily a natural process caused by wind, waves, and currents, however it can also be attributed to human driven processes such as development, grading, and beach armoring or nourishment. As climate change impacts hazards such as severe storms, hurricanes and tropical storms, and sea level rise, shorelines have the potential to change at different rates than in decades past. As tidal ranges increase, and storm surge becomes higher and potentially more intense, these processes may become exacerbated. Rapidly changing shorelines can have an impact on coastal ecosystem (particularly those that provide natural buffers), erode natural shorelines resulting in encroaching seas onto developed land, and may alter those shorelines that have been hardened to protect development and infrastructure.

#### 4.3.2 Existing Capabilities

As is the case with many communities, Preston does not have specific regulatory measures in place to regulate develop in areas at risk of shoreline change. However, as discussed above in Section 4.2.2, the Town does work to regulate development in at-risk coastal areas, therefore also regulating construction and infrastructure in areas that are at a greater risk of shoreline change impacts. In addition, the flood control structures along the tidal waters help to reduce extreme changes attributed to floods and storms.

#### 4.3.3 Vulnerabilities and Risk Assessment

Shoreline change and coastal erosion are generally not challenges in Preston since the majority of the shorefront is protected from direct wave action either by the railroad bridge at the mouth of Poquetanuck Cove or by the Mohegan Dike. However, as sea level rises, the effectiveness of the dike could be undermined such that erosion will be able to occur landward of this structure. Furthermore, tidal marshes can be lost over time.

##### 4.3.3.1 Hazard Losses

There are no reported losses for the Town of Preston related to shoreline change. Shoreline change losses such as coastal erosion are difficult to quantify because they are not reported via the tools typically reviewed for plan updates such as the NCEI Severe Storm database and the NFIP. Shoreline change losses are not quantified in the 2019 Connecticut Natural Hazard Mitigation Plan.

One potential measure of shoreline change loss is the total unmet need associated with living shoreline project costs for tidal marsh protection. To date, living shoreline projects have not been scoped or proposed for the upper Thames River communities. Future editions of this plan will revisit this topic.

## 5. Changing Precipitation

### 5.1. Climate Change Impacts

Across the United States, annual precipitation has increased in the past century, however, this change *is* dependent upon the region. Here in the northeast, precipitation totals and intensity are believed to have increased, and are projected to continue to increase during spring and winter months. However, climate change has also been linked to a reduction in snow cover extent, and an earlier spring melt. Winter precipitation may also change from snow to a wintry mix or rainfall due to warmer temperatures; so, while precipitation may increase it may not necessarily be an increase in snow.

Changes in precipitation can also shift the frequency and severity of droughts. As the climate warms, surface soil moisture is likely to decrease as evaporation rates rise. This decrease in soil moisture, and potentially longer periods of time between intense precipitation events, could potentially mean longer and stronger droughts.

These changes in precipitation can have various types of impacts. With an increase in intense precipitation, flooding events may become more frequent, damages to crops may occur, and spring flood trends may shift with less snow and more rain. Droughts on the other hand can also cause damage to crops, stress livestock and agricultural operations, and also reduce drinking water supplies or private wells.

### 5.2. Riverine and Pluvial Floods

#### 5.2.1 Setting and Recent Occurrences

Flooding is the primary hazard that impacts the town each year as documented in the previous edition of this plan. While riverine flooding along watercourses is a concern, shallow nuisance flooding and poor drainage have also caused flooding at several locations in the town. Flooding is typically caused by heavy rainstorms, but can also be caused by relatively light rains falling on frozen ground. Flooding of roadways is more common than damage to structures during pluvial and riverine floods in Preston.

The March 2010 storms remain some of the most severe flooding the town has experienced in over a decade, causing some roadway flooding, a significant amount of nuisance flooding, and some structural flooding as noted below.

- Lewis Road was overtopped by Broad Brook, Lake of Isles Road was overtopped by Main Brook and its tributary, Swantown Road overtopped (it also overtops during smaller storms), and Route 2A experienced poor drainage flooding.
- Five to seven basements in the vicinity of Schoolhouse Road and Cemetery Road flooded, as did basements on River Road, Watson Road, and Hollowell Road. Many homes that were affected had never needed pump outs previously.
- Matthewson Mill Road was overtopped by Shewville Brook and one nearby home was flooded.

The region has however seen some severe rainstorm events since the 2017 plan, with many neighboring communities having experienced serious flooding as a result.

The September 2018 rain event caused severe flooding throughout the state, with several communities in the SCCOG region receiving FEMA funding for the event. Neighboring Norwich received 4.85 inches of rainfall and Lebanon had a reported 6.79 inches.

Storm Ida, which produced several inches of rain across the state, caused flooding in many SCCOG communities. Norwich Public Utilities recorded 6.34 inches of rainfall and Groton-New London Airport recorded 2.05 inches. Washouts in Preston occurred as a result of flooding near the former State Hospital and the future Preston Riverwalk development, depositing significant quantities of sediment into a cove along the Thames River.

After the severe flashy drought of summer 2022, a severe rainstorm event on September 5-6, 2022, caused flooding throughout southeastern Connecticut. Lebanon experienced road closures and washouts, Lisbon was in the news for significant flooding along Newent Road, and Norwich Public Utilities observed 5.85 inches of rainfall. There were flood and flash flood warnings throughout the region and across the state. Neighboring Rhode Island reported 11 inches of rainfall in some communities.

### 5.2.2 Existing Capabilities

The Town attempts to mitigate inland flood damage and flood hazards by utilizing a wide range of measures including restricting activities in areas of flood risk, replacing bridges and culverts, promoting flood insurance, maintaining drainage systems, advancing education and outreach, and utilizing warning systems. Many mitigation measures are common to all hazards and therefore were listed in Section 2.6 and Section 2.7. Additional mitigation measures have been put in place by the State and Federal government upstream of Preston that helps to reduce flooding downstream, including several protection projects.

#### Flood Control Structural Projects

Several significant flood control projects have been constructed by the USACE upstream of Preston on the Shetucket and Quinebaug Rivers. These flood protection projects were completed in the 1950's and 1960's and greatly reduce the incidence and severity of flooding in Preston along those major watercourses.

#### Bridge Replacements, Drainage, and Maintenance

The Department of Public Works cleans and inspects catch basins and culverts at least annually or more often if problems are noted. When flooding occurs, the Public Works department or the Fire Department would handle the complaints depending on the location. For example, Public Works would inspect bridges and culverts and erect barricades to close roads, while the Fire Department responds to calls requesting help for flooded basements. The Department of Public Works performs culvert upgrades as necessary, and when funding is available, to mitigate flooding. The Town fields phone calls related to drainage complaints. Drainage complaints are directed to the First Selectman.

The Town is in the early stages of potentially organizing and implementing a stormwater utility. To help understand the benefits of implementing a stormwater utility, the Town participated in a stormwater utility feasibility study in fall 2022. A final report was issued to SCCOG and the Town in 2023, and one of the proposed hazard mitigation and climate adaptation actions builds on the completion of the study.

The town is hoping by implementing a stormwater utility, they can be proactive and prepared for future development challenges such as the Preston Riverwalk.

#### Regulations, Codes, and Ordinances

The Town of Preston has planning and zoning tools in place that incorporate floodplain management. The Town utilizes the 1% annual chance floodplain as defined by FEMA to regulate floodplain and floodway activities and requires 100 percent compensatory storage for any encroachment in the floodplain. The Town also requires new construction or substantial renovations to be located at an elevation greater than the base flood elevation.

The Town's Subdivision Regulations require that adequate drainage be provided to reduce exposure to flood hazards and that buildings and utilities be located to minimize the effects of flood damage. Regulations covering development in or within 100 feet of inland wetland or watercourse areas were last updated in 2010 and are enforced by the Town's Inland Wetlands and Watercourses Commission. The Town has also adopted a map prepared by the Conservation Commission which regulates building in wetland areas.

FEMA is currently working on updating flood mapping in certain parts of the region, including in Preston. It is expected that new FEMA Flood Insurance Rate Maps (FIRMs) will be available in August 2023 and will be effective October 2025. These updates should then be incorporated into zoning regulations.

#### Acquisitions, Elevations, and Property Protection

The Town of Preston has not performed acquisitions or elevations of properties with flood risk. Property protection has focused instead on preventive measures and maintaining and upgrading drainage systems. The Town is not opposed to performing acquisitions if property owners were willing and grant funding was available.

#### Flood Watches and Warnings

The First Selectman and the Fire Department access weather reports through the National Weather Service and local media. Residents can also sign up for the Statewide Reverse 9-1-1 to receive warnings when storms are imminent. The Town can telephone warnings into potentially affected areas using this system. The Town has a list of "watch" areas that they monitor for flooding during heavy rainfall.

The Town has compiled a list of addresses of structures within the 1% annual-chance floodplain and incorporated them into the Everbridge system, allowing them to alert property owners of predicted flood conditions. They are also able to track repair costs and determine long term flood damage costs to the Town.

#### Stormwater Management

The Town is in the early stages of potentially organizing and implementing a stormwater utility. To help understand the benefits of implementing a stormwater utility, the Town participated in a stormwater utility feasibility study in fall 2022. A final report was issued to SCCOG and the Town in 2023, and one of the proposed hazard mitigation and climate adaptation actions builds on the completion of the study.

The town is hoping by implementing a stormwater utility, they can be proactive and prepared for future development challenges such as the Preston Riverwalk.

#### Education and Outreach

The Town provides assistance with floodproofing techniques and flood insurance applications after flood events, upon request.

#### Summary

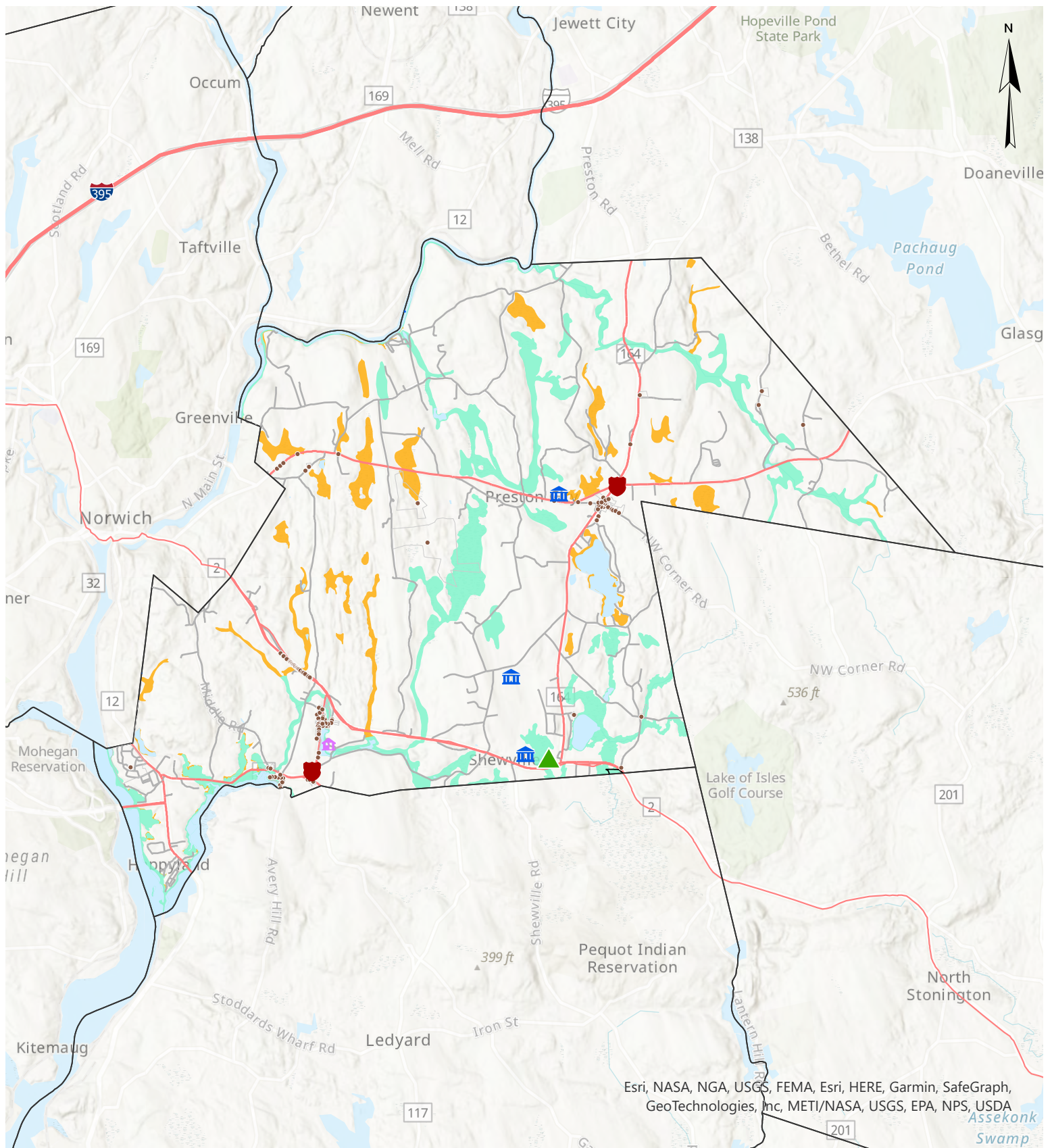
In general, municipal capabilities to mitigate flood damage have not increased significantly since the 2017 edition of the hazard mitigation plan was adopted. This is likely because the Town had increased capabilities in response to recent events and have continued to operate at this level.

#### 5.2.3 Vulnerabilities and Risk Assessment

This section discusses specific areas at risk to inland flooding within the Town. Nuisance flooding and poor drainage and overbank flooding are about equal in occurrence in the Town, with additional areas affected during more severe events.

#### Vulnerability Analysis of Areas along Watercourses

Major inland watercourses and water bodies in Preston have the 1% annual chance floodplain defined by FEMA. The Shetucket River, the Quinebaug River, the Thames River, Halsey Brook, and Poquetanuck Cove are mapped as Zone AE, indicating that flood elevations are available. The remaining streams are mapped as Zone A and include Poquetanuck Brook, the lower reach of Crowley Brook, Shewville Brook, Hewitt Brook, Cedar Swamp, Indiantown Brook, Main Brook, Lake of Isles Brook, Choate Brook, Broad Brook, Prentice Brook, and Miller Brook, as well as several other unnamed streams and swamp areas. Refer to Figure 5-1 for the location of the 1% annual chance floodplains within Preston.



Esri, NASA, NGA, USGS, FEMA, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, USDA

**Critical Facilities and Historic Resources with Flood Zones**

**SCCOG Hazard Mitigation and Climate Adaptation Plan**

Town of Preston

Date: 8/1/2022

0 0.55 1.1 1.65 2.2 Miles



**Legend**

- Historic Resources
- 🏠 Senior Housing
- 🛡️ Emergency Services
- 🏛️ Municipal
- ▲ Shelter or Cooling Center
- 🌊 1% Annual Chance Flood Hazard Area
- 🌊 .2% Annual Chance Flood Hazard Area
- 🌊 Floodway

Based on the information in the 2012 HMP and that provided by Town officials, the following areas along watercourses are vulnerable to flooding damage as shown in Table 5-1. Ice jams have not previously been an issue along the rivers in Preston. Instead, this flooding occurs due to insufficient culvert sizes at crossings or due to overbank flooding.

*Table 5-1 Roads in the 1% Annual Chance Floodplain in the Town of Preston*

<b>Watercourse or Water Body</b>	<b>Floodprone Road</b>
Avery Pond	Lynn Drive
Ayers Brook	Route 164
Broad Brook	Route 164, Route 165, Parks Road, Lewis Road
Choate Brook	River Road, Prodehl Road
Cooks Pond Outlet Stream	Cooktown Road
Hewitt Brook	Route 2, Route 164
Indiantown Brook	Route 2
Main Brook	Lake of Isles Road, Watson Road
Poquetanuck Brook	Schoolhouse Road, Hallville Road, Poquetanuck Road (Route 2A), Lincoln Park Road
Poquetanuck Cove	Route 2A
Shewville Brook	Matthewson Mill Road, Route 2
Tributary to Choate Brook	Stanton Lane
Unnamed Tributary to Quinebaug River	Old Jewett City Road near McClimon Road

Out of the roads listed in Table 5-1, Matthewson Mill Road, Poquetanuck Road (Route 2A), Stanton Lane, Lynn Drive, Swantown Road, and Lewis Road are the areas that are the most susceptible to being overtopped by flooding. Route 2A has acute issues with poor drainage exacerbating flooding conditions. The remaining roads would be affected by an extreme flood event.

#### Vulnerability Analysis of Private Properties

A total of 50 structures in Preston appear to be located in the 1% annual chance floodplain. A total of 29 are located in Zone A, 17 are located in Zone AE, and two appear to be located in the floodway. The majority of these structures are residential but some commercial and industrial structures are also located in the floodplain. Table 5-2 presents the number structures that are within the 1% annual chance floodplain by watercourse.



Table 5-2 Structures within the 1% Annual Chance Floodplain in the Town of Preston

Watercourse or Water Body	Flood Zone	Number of Structures
Avery Pond	Zone A	5
Broad Brook	Zone A	1
Choate Brook	Zone A	10
Halsey Brook	Zone AE	4
Hewitt Brook	Zone A	1
Poquetanuck Brook	Zone A	3
Poquetanuck Cove	Zone AE	11
Quinebaug River	Zone AE	4 (2 in floodway)
Shewville Brook	Zone A	2
Thames River	Zone AE	2
Tributary to Quinebaug River (Jewett City Road)	Zone A	4
Unnamed Tributary to Broad Brook (Krug Road)	Zone A	3
<b>Total</b>		<b>50</b>

The Town of Preston has several “watch areas” that they monitor for flooding during heavy rainfall. These watch areas include the areas in Table 5-2as well as homes that are susceptible to basement flooding. Such homes are located in the vicinity of Schoolhouse Road and Cemetery Road, River Road, Wattson Road, and Hollowell Road and not necessarily within the 1% annual chance floodplain. Structures most frequently affected by overbank flooding are located along Matthewson Mill Road, Stanton Lane, and Lynn Drive. While the flooding along Matthewson Mill Road and Stanton Lane is related to Shewville Brook and Choate Brook respectively, the flooding along Lynn Drive is related to Avery Pond. Thus, while culvert upgrades may mitigate flooding along the first two areas, homes along Lynn Drive will need to consider floodwalls, berms, or floodproofing to protect their property.

Note that repetitive flood insurance claims have not been filed at any properties in Preston over the past 40 years, suggesting that the flood damage to structures may be relatively minor. However, homes in the vicinity of Shewville Brook on Matthewson Mill Road have reportedly erected berms to attempt to control flooding suggesting that flooding in this area is a recurring issue.

#### Vulnerability Analysis of Critical Facilities

As noted in Section 2.7, critical facilities in Preston are not located within the 1% annual chance floodplain. Only a portion of the parking lot at the Public Works garage is located within the 1% annual chance floodplain, but it has not flooded in recent memory.

SCCOG completed an assessment of critical facilities in the region in 2017, fulfilling an action listed in the 2012 edition of the multi-jurisdiction hazard mitigation plan. The Public Works facility in Preston was included. The assessment determined that this facility in located in an area of partial riverine flood risk. Recommendations are incorporated into the list of actions in Section 8 of this annex and are summarized in Table 5-3 below.

Table 5-3 SCCOG Critical Facilities Assessment Town of Preston Summary

Facility	Address	Short-Term (0-20 years)	Long-Term (>20 years)
Preston Public Works	423 Route 2	No action needed	Wet and dry floodproofing

Given the relatively limited development in Preston, the closure of roadways and major transportation routes due to flooding is a concern for emergency personnel. For example, flooding along Hewitt Brook at Route 2 would cause a lengthy detour around the area via William Miller Road.

### 5.2.3.1 Hazard Losses

According to NFIP statistics, as of June 30, 2022, the Town of Preston has had a total of five flood related losses, with a total \$46,882 paid towards the claims. Since 2017 there has been one NOAA reported flash flood event, which caused one reported road closure. There were no reported financial losses associated with the damages. FEMA HAZUS-MH 6.0 was used to determine losses for various flood scenarios. Table 5-4 presents the residential, commercial, industrial, and other building related direct and business interruption losses. More HAZUS-generated loss estimates for riverine floods and downscaled flood losses based on the 2019 Connecticut Natural Hazard Mitigation Plan are developed in the Multi-Jurisdictional document.

Table 5-4 HAZUS-MH Flood Related Economic Losses

Preston	2022 Results				
	Residential	Commercial	Industrial	Other	Total
<b>Direct</b>					
Building	\$6,940,000	\$190,000	\$1,140,000	\$20,000	\$8,290,000
Contents	\$3,140,000	\$510,000	\$2,850,000	\$200,000	\$6,700,000
Inventory	\$0	\$50,000	\$420,000	\$0	\$470,000
Subtotal	\$10,080,000	\$750,000	\$4,410,000	\$220,000	\$15,460,000
<b>Business Interruption</b>					
Income	\$280,000	\$1,800,000	\$110,000	\$370,000	\$2,560,000
Relocation	\$1,930,000	\$370,000	\$70,000	\$230,000	\$2,600,000
Rental Income	\$1,030,000	\$270,000	\$40,000	\$40,000	\$1,380,000
Wage	\$670,000	\$1,150,000	\$190,000	\$2,560,000	\$4,570,000
Subtotal	\$3,910,000	\$3,590,000	\$410,000	\$3,200,000	\$11,110,000
<b>Total</b>	<b>\$13,990,000</b>	<b>\$4,340,000</b>	<b>\$4,820,000</b>	<b>\$3,420,000</b>	<b>\$26,570,000</b>

## 5.3. Drought

### 5.3.1 Setting and Recent Occurrences

A drought can occur during any season when there is a long, abnormally dry period of time. These events are naturally occurring during periods of limited precipitation. The effects of drought may vary throughout Town, with some sectors impacted more than others.

In recent years, droughts have become flashier and more frequent throughout the region. During recent events, there have been reports in the region of wells going dry on residential and farming properties. Some of the more severe and impactful events include:

- **2016** – A statewide drought that lasted almost two years and peaked in 2016, resulted in water conservation efforts throughout the southeastern part of the region, elevated fire risks in some areas, and was noted as the 11<sup>th</sup> driest spring on record.
- **2020** – From June to December, New London County experienced a moderate to severe drought, with the county being declared a Stage 3 by the Connecticut Interagency Drought Work Group.
- **2022** – During the development of this plan, the region was in an ongoing drought, with severe drought conditions in August 2022. The County was declared a Stage 3 drought emergency on August 18, 2022.

### 5.3.2 Existing Capabilities

The Town of Preston, like many communities, does not have specific regulations geared toward drought mitigation. One of the main purposes of the Towns zoning regulations is however to facilitate the adequate provision of water throughout the town, and to protect existing and potential public surface and ground drinking water supplies.

In Section 11D 2 of the Zoning Regulations, which is for the Preston City Village District, the Town recognizes that this district lies within the Amos Lake watershed which potentially has the ability to produce high yielding public water supply, therefore certain provisions have been implemented to preserve the integrity of this watershed.

The U.S. Drought Monitor is a national resource that many state and local entities use to monitor regional conditions in relation to drought development. The weekly reporting issued by the partnership includes a drought intensity scale which includes five stages from “abnormally dry” to “exceptional drought”. While this resource is available to Town for determining drought conditions, the Connecticut Interagency Drought Workgroup (IDW) uses this and other resources to monitor drought conditions specifically for the state. The Town of Preston has this IDW and state-specific drought emergency declarations as a resource to prepare for, and respond to, droughts.

### 5.3.3 Vulnerabilities and Risk Assessment

The entire Town of Preston is vulnerable to drought, but the degree of vulnerability varies. A majority of the properties in town rely on private wells for their residential or commercial drinking water. These private well users may face challenges relative to water supply during periods of drought.

Preston is also an agricultural community, with almost 10% of land use designated for crops and pasture hay. These operations could face challenges associated with irrigation during times of drought as wells and surface water supplies run low.

#### 5.3.3.1 Hazard Losses

There have been no reported drought losses for the Town of Preston. Any losses incurred by Norwich Public Utilities and Preston Plains Water Company have not been directly passed onto the Town’s

municipal resources, although water users will eventually pay for water system improvements that reduce drought risks. Downscaled drought losses from the 2019 Connecticut Natural Hazard Mitigation Plan are developed in the Multi Jurisdiction document.

## 5.4. Dam Failure

### 5.4.1 Setting and Recent Occurrences

Dam failures can be triggered suddenly with little or no warning and often in connection with natural disasters such as floods and earthquakes. Dam failures can occur during flooding when the dam breaks under the additional force of floodwaters. In addition, a dam failure can cause a chain reaction where the sudden release of floodwaters causes the next dam downstream to fail. While flooding from a dam failure generally has a limited geographic extent, the effects are potentially catastrophic depending on the downstream population. A dam failure affecting Preston is considered a possible event each year with potentially critical effects. No dam failures affected the town since the time of the last HMP.

The Norwich State Hospital Dam, a moderate hazard dam, failed in 1986. Route 2A overflowed downstream but there was no significant damage. It was subsequently rebuilt by the State of Connecticut and recently acquired by the Town of Preston. This is the only dam failure that Town officials could recall in recent memory.

### 5.4.2 Existing Capabilities

The Connecticut DEEP administers the Dam Safety Section and designates a classification to each state-registered dam based on its potential hazard. As noted in the Multi-Jurisdictional HMP, Preston is home to one Class B (significant hazard) dam, and three additional Class B or Class C dams are located upstream of Preston whose failure could potentially lead to flooding within the town. All registered dams in town are listed on Table 5-5.

*Table 5-5 Dams Registered with DEEP in the Town of Preston*

CT Dam#	Dam Name	Dam Class	Owner Type
11417	Watson Pond	-	Private
11403	Ayer Pond Dam	A	Private
11405	Folwix Brook Pond Dam	A	Private
11406	Shewville Brook Pond Dam	A	Private
11408	Straight Pond Dam-Need To Confirm Breach	A	State Owned
11409	Gay Pond Dam	A	Private
11412	Hollowell Road Pond	A	Private
11414	Lewis Pond Dam	A	Private
11401	Tunnel Dam Hydro Station	B	Power Utility
11402	Norwich State Hospital Pond Dam	BB	Municipal
11410	Hallville Pond Dam	BB	Private Corporation

Dams in the region whose failure could impact Preston are under the jurisdiction of the Connecticut DEEP. The dam safety statutes are codified in Section 22a-401 through 22a-411 inclusive of the Connecticut General Statutes. Sections 22a-409-1 and 22a-409-2 of the Regulations of Connecticut

State Agencies have been enacted, which govern the registration, classification, and inspection of dams. Dams must be registered by the owner with the DEEP according to Connecticut Public Act 83-38.

Owners of high and significant hazard dams are required to maintain EOPs for such dams. The Town of Preston only owns one dam, the Norwich Hospital Pond Dam (a moderate hazard dam) at the former Norwich State Hospital Site. The Town continues to maintain this dam in good condition; it was recently inspected as per State statutes and found to be in good condition.

The 2012 edition of this plan noted that the Town had concerns about the structural integrity of Hallville Pond Dam, a privately-owned moderate hazard dam in Hallville along Poquetanuck Brook. The State of Connecticut performed repairs on this dam and completed the installation of a fish ladder at the site in May 2013.

#### Summary

In general, municipal capabilities to mitigate dam failure damage have not increased significantly since the 2017 edition of the hazard mitigation plan was adopted. Additionally, changes in the State's regulation of dams have increased Statewide capabilities.

#### 5.4.3 Vulnerabilities and Risk Assessment

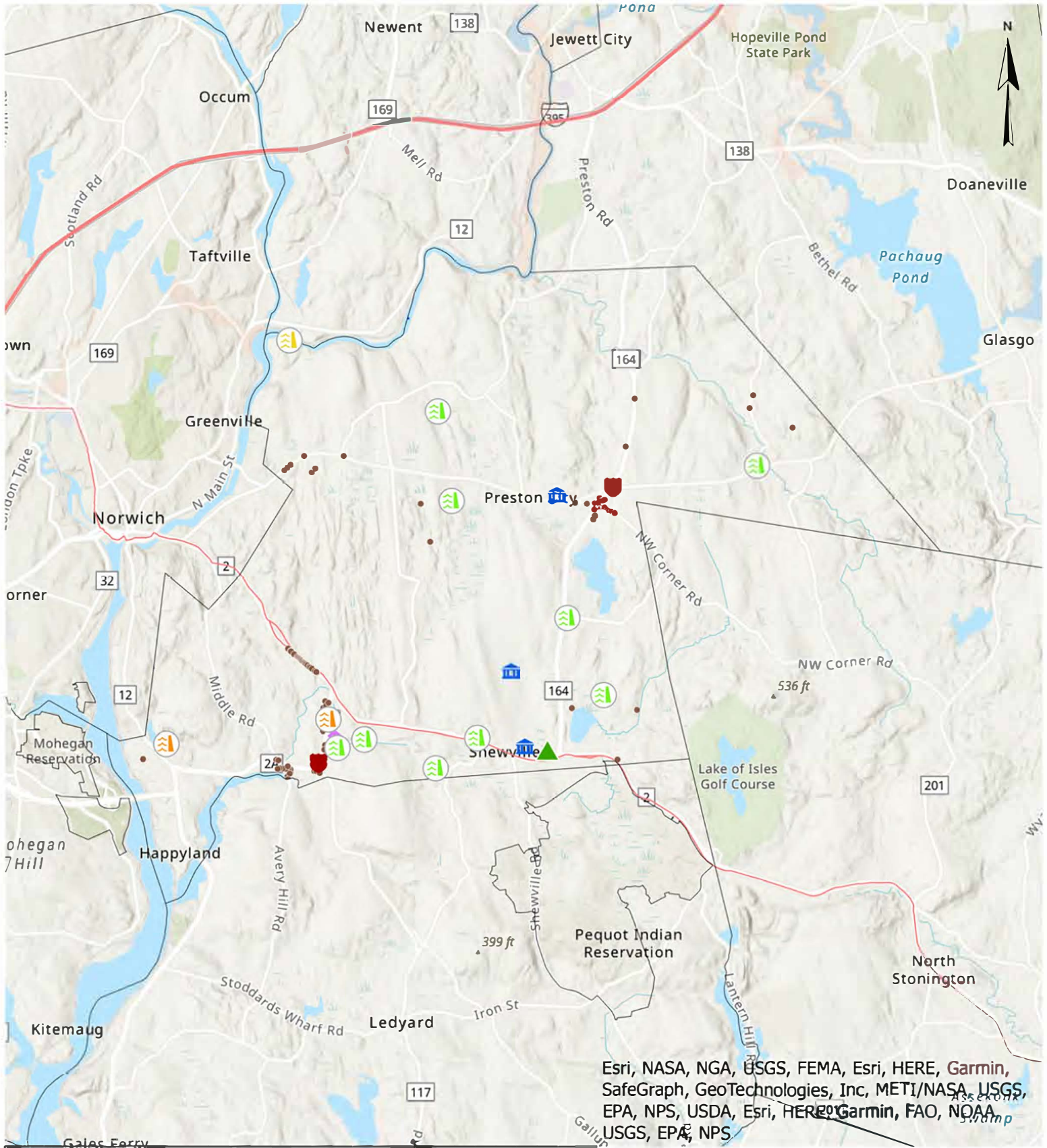
The potential impacts related to the failure of Class C and Class B dams within or upstream of Preston are described below. Where information was available, the descriptions below are based on information available at the Connecticut DEEP Dam Safety files.

- *Aspinook Pond Dam* – This privately-owned Class B dam impounds the Quinebaug River to provide hydroelectric power generation. Failure of this dam could cause a flood similar to the 1% annual chance flood downstream in Jewett City, Lisbon, and Griswold. Undeveloped areas of Preston could also be affected near the bend in the Quinebaug River.
- *Greeneville Dam* – Greeneville Dam is a Class C dam located on the Shetucket River and owned by Norwich Public Utilities. The dam was constructed in 1888 and is a timber crib structure used for hydroelectric power generation. Failure of this dam would likely result in an inundation area similar to the 1% annual chance flood event for areas downstream along the Shetucket River from the dam to the Thames River. Areas along the Thames River in the vicinity of the former Norwich State Hospital and Happyland could potentially be impacted by minor flooding.
- *Taftville Dam #4* – Taftville Dam #4 is a Class C dam located on the Shetucket River between Norwich and Lisbon and is privately owned. The dam impounds water for hydroelectric power generation. Failure of this dam would likely result in an inundation area similar to the 1% annual chance flood event for areas downstream along the Shetucket River from the dam to the Thames River, including undeveloped areas of Preston.
- *Tunnel Dam* – This Class B dam that impounds the Quinebaug River is privately-owned and located between Preston and Sprague just upstream of the confluence with the Shetucket River. The dam was originally constructed to provide power for industrial purposes, but now is utilized for hydroelectric power generation. Failure of this dam would likely cause minor flooding along

the Shetucket River downstream to Taftville Dam #4, with no structures being affected in Preston.

#### *5.4.3.1 Hazard Losses*

Despite the dam-related incident in 1986 described above, there are no reported losses for the Town of Preston related to dam failure. Downscaled losses from the 2019 Connecticut Natural Hazard Mitigation Plan are developed in the Multi-Jurisdiction document.

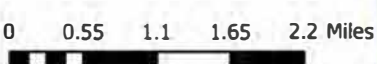


Esri, NASA, NGA, USGS, FEMA, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, USDA, Esri, HERE, Garmin, FAO, NOAA, USGS, EPA, NPS

**Dams and Dam Failure Inundation Areas**

Southeastern Connecticut Council of Governments  
Town of Preston

Date: 2/23/2023



**Legend**

- Dams
- A
- B
- BB
- Historic Resources
- Senior Housing
- Emergency Services
- Municipal
- Shelter or Cooling Center
- Dam Failure Inundation Area

## 6. Rising Temperatures

### 6.1. Climate Change Impacts

On average, the annual temperature across the U.S. has increased by 1.8 degrees Fahrenheit when looking at the entire period of record (1895-2016). Accelerated warming patterns between 1979 and 2016 have been observed with satellite and surface data, and paleoclimate records show that some of the recent decades have been the warmest in the past 1,500 years.<sup>2</sup>

In general, periods of freeze and frost have decreased, therefore lengthening the period of time between the first winter freeze and spring thaw, since the early 1900's. These warming temperatures impact snowfall and accumulation, alter seasonal patterns, and can disrupt certain natural processes. In addition, warming temperatures can act as fuel for other natural hazards such as wildfires, droughts, hurricanes and severe storms, and also play a role in changing precipitation patterns.

In addition to exacerbating some natural hazards, extreme heat waves are becoming more frequent, which can also have a serious impact on public health. In recent years, the region has experience numerous heat waves, with several consecutive days of extremely hot temperatures and high heat indexes. Infrastructure can also be at risk during heat waves as some components, such as roadways or bridges, have not been designed to withstand ongoing, extreme temperatures.

### 6.2. Extreme Heat

#### 6.2.1 Setting and Recent Occurrences

An extreme heat event can occur at any time during the warmer months, and can be defined as temperatures that hover 10 degrees or more above the average high temperature for the region. These events typically last for a prolonged period of time and is accompanied by high humidity. A heat wave, typically lasts three or more days with temperatures over 90 degrees for those days.

Since 2012, 480 days over 85 degrees have been recorded at the Norwich Public Utilities weather stations, 165 of which were over 90 degree days. During the summer of 2022, 45 days over 85 degrees were recorded, 21 of which were at least 90 degrees. A majority of these high temperature days occurred in July and August, with some of these extreme temperatures occurring outside summer months in May and October. Table 6-1 presents the daily maximum temperatures recorded at the Groton New London Airport and Norwich Public Utilities weather stations. Those values that are bold are above 90 degrees.

Table 6-1 Daily Maximum Temperatures from May to September Since 2017

	May		June		July		August		September	
	<i>GNL</i>	<i>NPU</i>	<i>GNL</i>	<i>NPU</i>	<i>GNL</i>	<i>NPU</i>	<i>GNL</i>	<i>NPU</i>	<i>GNL</i>	<i>NPU</i>
2017	85	<b>93</b>	89	<b>94</b>	88	<b>92</b>	87	89	86	89
2018	80	<b>91</b>	87	<b>90</b>	89	<b>101</b>	91	<b>94</b>	90	92
2019	83	85	88	<b>91</b>	94	<b>96</b>	88	<b>91</b>	87	84
2020	75	81	82	<b>91</b>	<b>92</b>	<b>96</b>	89	<b>92</b>	87	87
2021	88	87	86	<b>96</b>	86	<b>94</b>	88	<b>96</b>	82	85
2022	<b>93</b>	<b>92</b>	85	<b>92</b>	<b>91</b>	<b>96</b>	<b>91</b>	<b>94</b>	<b>94</b>	85

<sup>2</sup> <https://nca201758.globalchange.gov/chapter/2/>



## 6.2.2 Existing Capabilities

Similar to the monitoring methods used for hurricanes, severe storms, and winter storms, the Town monitors National Weather Service and local forecasts for anticipated extreme heat event, and also monitors for NWS heat warnings and advisories. The Town of Preston has identified the Preston Plains Middle School as the primary cooling center in town. In the event of a projected heat event or heat wave, the Town is prepared to open up the cooling centers for resident use.

### Summary

In general, the capabilities of mitigating extreme heat have increased since the 2017 edition of this plan as the town has identified a cooling center for use during an extreme heat event.

## 6.2.3 Vulnerabilities and Risk Assessment

While the entire town is at risk of an extreme heat event, vulnerability can widely vary based on age, health, or the type of property owned in Preston. The elderly populations in town are more vulnerable to extreme heat events, particularly when in home cooling is not available. Also, those in town with certain health conditions may also be more vulnerable to the health factors associated with extreme temperatures.

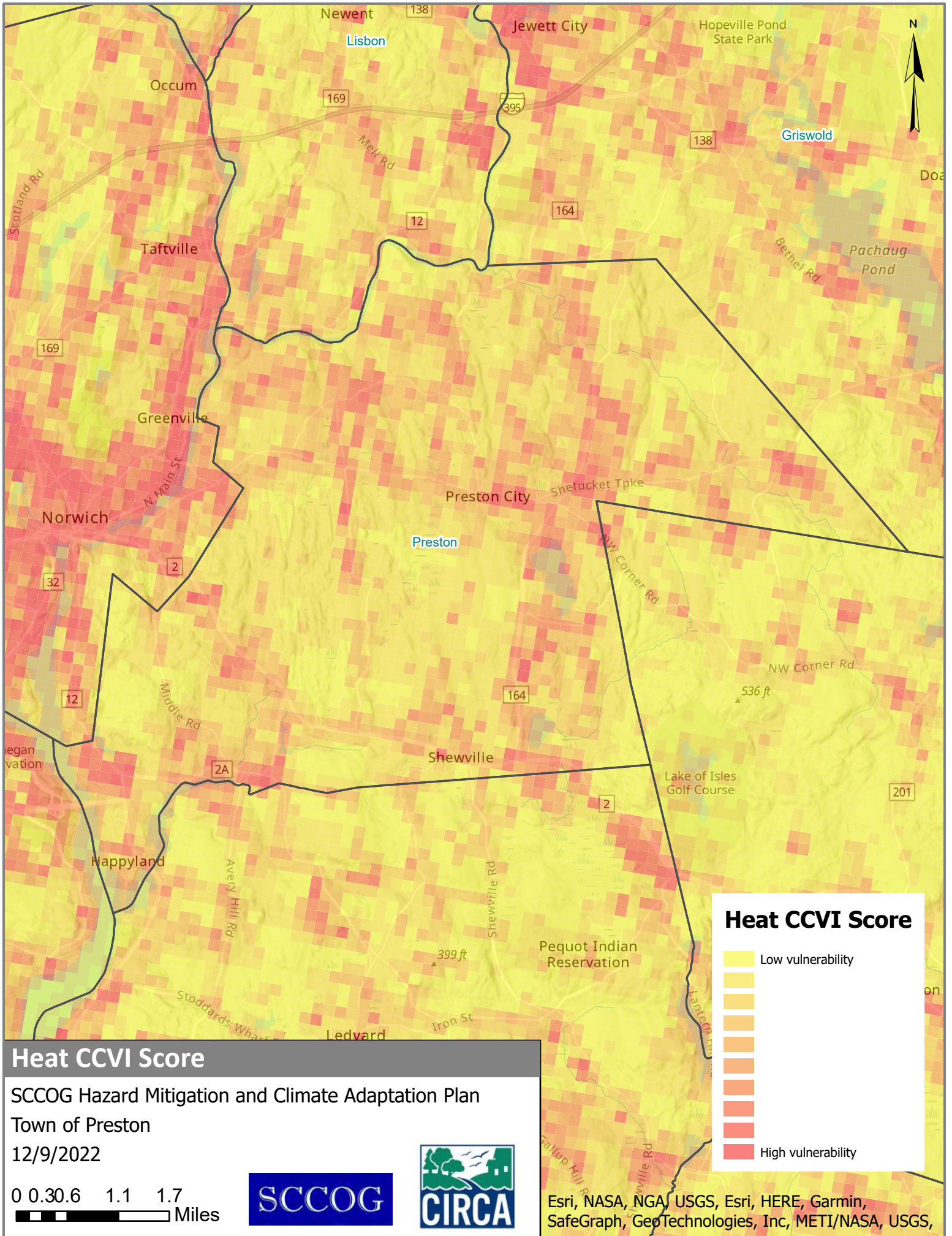
Similar to drought, the livestock operations during these heat events may also be at risk of loss if cooling capabilities are challenged or absent. If an extreme heat event coincided with a power outage, there could be a serious public health concern and economic impact to the farmers.

CIRCA developed a tool to aid in understanding extreme heat vulnerability for communities across the state. This tool, known as the Climate Change Vulnerability Index (CCVI), is comprised of dozens of factors that contribute to a community's heat sensitivity, exposure, adaptive capacity, and ultimately their overall heat vulnerability. The CCVI has been used as an additional tool to characterize heat vulnerability for Preston. The distribution of heat vulnerability throughout the community can be seen in Figure 6-1.

With low building density and few impervious surfaces, Preston has relatively low heat exposure. Heat sensitivity is low to moderate across most of the municipality, with the highest sensitivity in the village of Preston City. A single facility, Preston Plains Middle School, serves as both shelter and cooling center, although the low population of the town suggests that this may be sufficient for adaptive capacity. Therefore, the overall heat vulnerability for Preston is low to moderate.

### 6.2.3.1 Hazard Losses

There are no reported losses for the Town of Preston related to extreme temperatures. Future editions of this plan will revisit this topic.



## Heat CCVI Score

SCCOG Hazard Mitigation and Climate Adaptation Plan

Town of Preston

12/9/2022

0 0.30.6 1.1 1.7  
 Miles



Esri, NASA, NGA, USGS, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS,

## 6.3. Wildfires

### 6.3.1 Setting and Recent Occurrences

Wildfires are considered to be highly destructive, uncontrollable fires. The most common causes of wildfires are arson, lightning strikes, and fires started from downed trees hitting electrical lines. Thus, wildfires have the potential to occur anywhere and at any time in both undeveloped and lightly developed areas of Preston. Preston typically experiences several brush-fires each year. Most brush fires are small and quickly contained to a few acres maximum. No major fires could be recalled in recent history.

Structural fires in higher density areas of the town are not directly addressed herein. Notwithstanding this statement, it is important to note that a significant structure fire occurred in the former Norwich State Hospital on January 29, 2023. This is an area that had been raised as a concern, relative to the lack of fire protection, during the local planning meetings for this HMCAP.

### 6.3.2 Existing Capabilities

Monitoring of potential fire conditions is an important part of mitigation. The Connecticut DEEP Forestry Division uses the rainfall data recorded by the Automated Flood Warning system to compile forest fire probability forecasts. This allows the DEEP to monitor drier areas to be prepared for forest fire conditions. The Town can access this information over the internet. The Town also receives “Red Flag” warnings via local media outlets.

Existing mitigation for wildland fire control is typically focused on building codes, public education, Fire Department training, and maintaining an adequate supply of equipment. The Town’s EOP recommends a 30-50 foot cleared radius be maintained around homes and buildings to prevent wildfires. The Preston Volunteer Fire Departments have a strong mutual aid relationship with their neighbors to fight wildfires. The Town has off-road equipment to access distant fires, and goes to the fires as quickly as possible. The Town has good access to most areas for fire-fighting. Preston has one full-time Fire Marshal and two full time firefighting personnel, with the rest of the department being staffed by volunteers.

Fire protection water is obtained through 19 dry hydrants, several draft sites, and from public water systems located on Route 164, Route 2, and Route 12. Areas located along the southern portion of Route 164 have water service through the Preston Plains Water Company, which can receive water as needed from the Mashantucket Pequot Tribal Nation Utilities water system. Norwich Public Utilities provides water service along Route 12. These agencies test fire flows regularly and inform the fire departments of the pressure available. The I.S.O evaluated the Town prior to the 2017 HMP and gave it a high fire safety rating. This benefited fire-insurance holders by lowering rates.

In areas located far from available hydrants, the fire department drafts water from the various streams, ponds, and rivers in the town, and rely on pump trucks to carry water to distant areas. Some areas, such as the Strawberry Park Campground, have their own water systems with some water storage available to fight fires. The amount of fire protection afforded by the existing hydrants and nearby water bodies is considered to be good for the development level of Preston. The Fire Departments will continue to evaluate the level of risk and the need for additional hydrants as development continues in the future.

The Connecticut DEEP has recently changed its Open Burning Program. It now requires individuals to be nominated and designated by the Chief Executive Officer in each municipality that allows open burning and to take an online training course and exam to become certified as an "Open Burning Official." Preston has designated its full-time Fire Marshal as the Town Open Burning Official. Permit template forms were also revised that provide permit requirements so that the applicant/permittee is made aware of the requirements prior to, during, and after burn activity. The regulated activity is then overseen by the Town.

#### Summary

In general, municipal capabilities to mitigate wildfire damage have remained strong since the 2017 edition of the hazard mitigation plan was adopted, as evidenced by the high fire safety rating given by the I.S.O.

### 6.3.3 Vulnerabilities and Risk Assessment

As Preston is largely forested, wildfires can occur almost anywhere due to the undeveloped nature of the town. The most vulnerable areas are those undeveloped areas between the major north-south roads in town and near the former Norwich State Hospital Site. The undeveloped area west of Middle Road is a particular concern for fires due to lack of access to this area. Other undeveloped areas that are not nearby public water service, dry hydrants, or water bodies are considered to be moderate risk due to the need to transport fire fighting water, and the fact that off-road equipment must be utilized to fight fires. The remaining areas of the town that are located nearby water sources are considered to be a low-risk area for wildfires. Refer to Figure 3-6 in the Multi-Jurisdictional HMCAP for a general depiction of wildfire risk areas within Preston.

#### 6.3.3.1 Hazard Losses

There are no reported losses for the Town of Preston related to wildfires. Downscaled losses from the 2019 Connecticut Natural Hazard Mitigation Plan using WUI acreage are developed in the Multi-Jurisdictional document.

## 7. Earthquakes

### 7.1. Climate Change Impacts

Earthquakes are not a climate related hazard, therefore there are no expected impacts as a result of climate change. There are however secondary impacts that could be a concern and amplify the damages of an earthquake. The deterioration of infrastructure from extreme heat or salt water as a result of coastal flooding or sea level rise, may weaken certain components making them more prone to damage or collapse during an earthquake event. Flooding events can also leave some landscapes at a higher risk of landslides; an earthquake could potentially prompt a landslide in post-flooded areas.

### 7.2. Earthquakes

#### 7.2.1 Setting and Recent Occurrences

An earthquake is a sudden rapid shaking of the earth caused by the breaking and shifting of rock beneath the earth's surface. Earthquakes can cause buildings and bridges to collapse; disrupt gas, electric, and telephone lines; and often cause landslides, flash floods, fires, avalanches, and tsunamis. Earthquakes can occur at any time and often without warning. Detailed descriptions of earthquakes, scales, and effects can be found in the Multi-Jurisdictional HMP. Despite the low probability of an earthquake occurrence, earthquake damage presents a potentially catastrophic hazard to the town. However, it is very unlikely that the town would be at the epicenter of such a damaging earthquake. No major earthquakes have affected the town since the last HMP.

#### 7.2.2 Existing Capabilities

The Connecticut Building Codes include design criteria for buildings specific to each region as adopted by Building Officials and Code Administrators (BOCA). These include the seismic coefficients for building design in Preston. The Town has adopted these codes for new construction, and they are enforced by the Building Inspector.

Due to the infrequent nature of damaging earthquakes, Town land use policies do not directly address earthquake hazards. Earthquakes are indirectly addressed through policies preventing residential development in areas prone to collapse such as below steep slopes or areas prone to liquefaction. The potential for an earthquake and emergency response procedures is addressed in the Town's EOP.

#### Summary

In general, municipal capabilities to mitigate earthquake damage have not increased since the 2017 edition of the hazard mitigation plan was adopted. This is because the hazard continues to pose a low risk of damage to the Town.

#### 7.2.3 Vulnerabilities and Risk Assessment

Surficial earth materials behave differently in response to seismic activity. Unconsolidated materials such as sand and artificial fill can amplify the shaking associated with an earthquake. As noted in Section 2.1, areas along the Quinebaug River, the Shetucket River, the Thames River, Broad Brook, Crowley Brook, Shewville Brook, Hewitt Brook, Poquetanuck Brook, Halsey Brook and Amos Lake are underlain by stratified drift, as are areas along minor streams. These areas are potentially more at risk for earthquake damage than the areas of the town underlain by glacial till. The best mitigation for

future development in areas of sandy material is the application of the most stringent standards in the Connecticut Building Code, exceeding the building code requirements, or, if the Town deems necessary, the possible prohibition of new construction. The areas that are not at increased risk during an earthquake due to unstable soils are the areas underlain by glacial till.

Several inactive bedrock faults are located within Preston. Unlike seismic activity in California, earthquakes in Connecticut are not associated with specific known active faults. However, bedrock in Connecticut and New England in general is typically formed from relatively hard metamorphic rock that is highly capable of transmitting seismic energy over great distances. For example, the relatively strong earthquake that occurred recently in Virginia was felt in Connecticut because the energy was transmitted over a great distance through such hard bedrock.

The built environment in the town primarily includes some more recent construction that is seismically designed. However, most buildings were built before the 1990's and therefore are not built to current building codes. In addition, there are two campgrounds containing tents and trailers that also likely have recreational buildings or shelters that may not be seismically designed. Thus, it is believed that most buildings would be at least moderately damaged by a significant earthquake. Those town residents who live or work in older, non-reinforced masonry buildings are at the highest risk for experiencing earthquake damage.

Areas of steep slopes can collapse during an earthquake, creating landslides. Preston has many areas of steep slopes and bluffs although the majority of these features occur in undeveloped areas. Thus, landslides are not a concern in the town.

Seismic activity can also break utility lines such as water mains, gas mains, electric and telephone lines, and stormwater management systems. Damage to utility lines can lead to fires, especially in electric and gas mains. Dam failure can also pose a significant threat to developed areas during an earthquake. For this HMP, dam failure has been addressed separately in Section 10.0. As noted previously, most utility infrastructure in the town is located above ground. A quick and coordinated response with Connecticut Light & Power and other utilities will be necessary to inspect damaged utilities following an earthquake, to isolate damaged areas, and to bring backup systems online. This is covered in the EOPs for these entities.

#### 7.2.4 Hazard Losses

There are no reported losses for the Town of Preston related to earthquakes. Downscaled losses from the 2019 Connecticut Natural Hazard Mitigation Plan are developed in the Multi-Jurisdictional document. In addition, a *HAZUS-MH* analysis of the potential economic and societal impacts to the SCCOG region from earthquake damage is detailed in the Multi-Jurisdictional HMP. The analysis addresses a range of potential impacts from any earthquake scenario, estimated damage to buildings by building type, potential damage to utilities and infrastructure, predicted sheltering requirements, estimated casualties, and total estimated losses and direct economic impact that may result from various earthquake scenarios.

Table 7-1 HAZUS-MH Earthquake Related Economic Impacts

<b>Preston</b>	<b>Residential</b>	<b>Commercial</b>	<b>Industrial</b>	<b>Others</b>	<b>Total</b>
	\$44,660,000	\$52,220,000	\$16,020,000	\$18,630,000	131,530,000

## 8. Mitigation Strategies and Actions

### 8.1. Status of Mitigation Strategies and Actions

A total of ten hazard mitigation actions were developed in the previous edition of this plan. The status of each is listed below.

#	Mitigation Actions and Strategies for Preston 2016 - 2021	Status	Status Details
1	Develop a checklist for land development applicants that cross-references the specific regulations and codes related to disaster resilience	Remove	The Town no longer needs this. The existing sets of regulations accomplish the intent of this action.
2	Integrate elements of this HMP into the Plan of Conservation and Development during the next update	Remove	This has been partly accomplished and will be further advanced with the next update.
3	Work with State and Federal agencies to ensure that flood protection regulations reflect current standards regarding sea level rise	Underway	There are some updates that need to be made related to floodplain regulations and to reflect 2021 statutory updates. This will reportedly be done soon.
4	Visit schools and educate children about the risks of flooding and how to prepare	Carry Forward with Revisions	The EMD maintains a fire prevention program where the emergency management and fire staff go to schools and provide education on fires and fire prevention. The EMD noted that flood risks could easily be incorporated into the program.
5	Pursue the acquisition of additional open space in SFHAs	Carry Forward with Revisions	There is not much flood hazard area that isn't already open space, but this will be considered under the POCD update.
6	Encourage the State to upgrade culverts along Route 2A.	Complete	Potentially complete; final stages need to be confirmed.
7	Determine an appropriate frequency to send out regular flood-hazard informational mailings, and set-up a mechanism to send out those mailings regularly.	Carry Forward with Revisions	Rework to achieve public education goal, but not necessarily via mailings. Potentially combine with #4.
8	Incorporate wet and dry floodproofing of the Public Works Garage into the Town's long term planning by including such plans in the POCD and the Capital Improvements Plan.	Carry Forward	Carry forward – Nothing has been done yet, but the Town would like to look into achieving if still needed.
9	Explore the possibility of installing a microgrid at its municipal buildings, utilizing the solar panels on the roofs.	Carry forward	The town recently had solar panels assessed and they reportedly do not generate much energy, so it is not clear that a microgrid is feasible. Will check with Public Works to confirm.
10	Extend fire protection to future areas identified as being particularly at-risk	Carry Forward with Revisions	Carry forward with revision - The only future at-risk area of need would be the former State Hospital property.



During the planning process, CIRCA and consultant staff facilitated a discussion with the Town staff to identify the greatest climate change concerns and challenges. The previous actions were re-evaluated in this context. Elements of about half of the prior actions have been carried forward into the new hazard mitigation and climate adaptation actions.

## 8.2. Prioritization of Specific Actions

The proposed actions for the Town of Preston to undertake from 2023 through 2028 are listed in Table 8-1 on the next page. The full list of actions for the region with buildups for the PERSISTS and STAPLEE scores are available in the multi-jurisdiction document.

The actions with the highest PERSISTS score and the highest STAPLEE score are different, which is consistent with the intent of the two scores. PERSISTS scores tend to be higher for actions that maximize public safety while advancing climate science and being transferable to other communities, whereas STAPLEE scores tend to be higher for actions that are highly cost effective and technically feasible for reducing losses from hazards. The actions with the highest combined scores are:

- Develop locally-adopted recommendations resulting from the stormwater authority and utility feasibility study conducted by CDM Smith for SCCOG in 2022 using CIRCA's municipal resilience grant.
- Reduce the potential for stormwater-related erosion and washouts at the Riverwalk site using stormwater infrastructure and green infrastructure.
- Incorporate wet and dry floodproofing of the Public Works Garage (recommended in the Southeastern Connecticut Critical Facilities Assessment) into the Town's long term planning by including such plans in the POCD (2024) and the Capital Improvements Plan.

The Town intends to focus on the above actions, along with the sole action about cooling centers:

- Because Preston Plains Middle School is the emergency shelter for storms, water supply, and charging, formalize its use as a cooling center. Ensure that standby power can operate the AC and that transit or alternate transportation options are available to bring seniors and other vulnerable people to the cooling center.

This is consistent with the State's emphasis on cooling center resilience.

Table 8-1 Town of Preston Actions and STAPLEE and PERSISTS Scores

Number	Hazard Mitigation and Climate Adaptation Actions	Hazard Mitigation and Climate Adaptation Goal	Type of Action	Responsible Department	Approx. Cost Range	Potential Funding Sources	Timeframe	Priority	PERSISTS Score	STAPLEE Score	PERSISTS x STAPLEE =
PR1	Because Preston Plains Middle School is the emergency shelter for storms, water supply, and charging, formalize its use as a cooling center. Ensure that standby power can operate the AC and that transit or alternate transportation options are available to bring seniors and other vulnerable people to the cooling center.	Ensure that critical facilities are resilient, with special attention to shelters and cooling centers.	Preparedness & Emergency Response	Emergency Management	\$100,000 - \$500,000	FEMA HMA; Other Preparedness Grants; STEAP	7/2023 - 6/2025	High	16	6	96
PR2	Look for opportunities to harden power lines and evaluate the feasibility of a microgrid (potentially solar) for Town facilities such as Public Works and Preston Plains School.	More than one goal	Preparedness & Emergency Response	Office of the Chief Elected Official	\$500,000 - \$1M	FEMA HMA; Other Preparedness Grants; STEAP	7/2023 - 6/2025	High	15	4	60
PR3	Incorporate wet and dry floodproofing of the Public Works Garage (recommended in the Southeastern Connecticut Critical Facilities Assessment) into the Town's long term planning by including such plans in the POCD (2024) and the Capital Improvements Plan.	Reduce flood and erosion risks by reducing vulnerabilities and consequences, even as climate change increases frequency and severity of floods.	Property Protection	Public Works	\$0 - \$10,000	Municipal CIP Budget; FEMA HMA	7/2023 - 6/2024	Medium	15	10	150
PR4	Determine an appropriate frequency to distribute flood-hazard informational materials (print vs. social media) and set-up a mechanism to do this annually.	Reduce flood and erosion risks by reducing vulnerabilities and consequences, even as climate change increases frequency and severity of floods.	Education & Awareness	Emergency Management	\$0 - \$10,000	Municipal Operating Budget	1/2024 and annually during January	Medium	14	4	56
PR5	Incorporate flooding risk information into the fire	Reduce flood and erosion risks by reducing vulnerabilities and	Education & Awareness	Emergency Management	\$0 - \$10,000	Municipal Operating Budget	7/2023 - 6/2024	Low	14	4	56

Number	Hazard Mitigation and Climate Adaptation Actions	Hazard Mitigation and Climate Adaptation Goal	Type of Action	Responsible Department	Approx. Cost Range	Potential Funding Sources	Timeframe	Priority	PERSISTS Score	STAPLEE Score	PERSISTS x STAPLEE =
	prevention program given at schools.	consequences, even as climate change increases frequency and severity of floods.									
PR6	Identify specific remaining opportunities for open space in the SFHA; incorporate this into the POCD when it is updated in 2024.	Reduce flood and erosion risks by reducing vulnerabilities and consequences, even as climate change increases frequency and severity of floods.	Natural Resources Protection	Planning	\$0 - \$10,000	Municipal Operating Budget	7/2023 - 6/2024	Medium	14	7	98
PR7	Extend public water supply along Route 2 to reduce drought risks to critical facilities, essential facilities, and private properties.	Reduce losses from other hazards that are affected by climate change.	Water & Wastewater Utility Projects	Office of the Chief Elected Official	>\$1M	DWSRF; Municipal CIP Budget; MPTN Utility Funds	7/2024 - 6/2026	Medium	14	4	56
PR8	Extend fire protection to the former State Hospital property as this remains an at-risk area.	Reduce losses from other hazards that are affected by climate change.	Water & Wastewater Utility Projects	Office of the Chief Elected Official	>\$1M	DWSRF; NPU CIP Budget	7/2024 - 6/2026	Medium	14	7	98
PR9	Develop locally-adopted recommendations resulting from the stormwater authority and utility feasibility study conducted by CDM Smith for SCCOG in 2022 using CIRCA's municipal resilience grant.	Reduce flood and erosion risks by reducing vulnerabilities and consequences, even as climate change increases frequency and severity of floods.	More than one category	Office of the Chief Elected Official	\$0 - \$10,000	SCCOG Special Projects; DEEP Climate Resilience Fund; CIRCA Resilient Connecticut	7/2023 - 6/2025	High	18	8	144
PR10	Upgrade drainage system, where feasible and necessary, during roadway improvements along Route 2A in the historic village area.	Invest in resilient corridors to ensure that people and services are accessible during floods and that development along corridors is resilient over the long term.	Structural Projects	Public Works	>\$1M	CT DOT; LOTCIP; Municipal CIP Budget	7/2023 - 6/2025	Medium	13	5	65
PR11	Reduce the potential for stormwater-related erosion and washouts at the Riverwalk site using stormwater infrastructure and green infrastructure.	Reduce flood and erosion risks by reducing vulnerabilities and consequences, even as climate change increases	Structural Projects	Office of the Chief Elected Official	>\$1M	FEMA HMA; STEAP; CT DECD; Private funds from Riverwalk	7/2023 - 6/2025	High	19	6	114

Number	Hazard Mitigation and Climate Adaptation Actions	Hazard Mitigation and Climate Adaptation Goal	Type of Action	Responsible Department	Approx. Cost Range	Potential Funding Sources	Timeframe	Priority	PERSISTS Score	STAPLEE Score	PERSISTS x STAPLEE =
		frequency and severity of floods.									
PR12	Require floodplain manager and land use staff to take free training at <a href="https://portal.ct.gov/DEEP/P2/Chemical-Management-and-Climate-Resilience/Chemical-Management-and-Climate-Resilience">https://portal.ct.gov/DEEP/P2/Chemical-Management-and-Climate-Resilience/Chemical-Management-and-Climate-Resilience</a> to reduce risks of spills from businesses during floods.	Reduce flood and erosion risks by reducing vulnerabilities and consequences, even as climate change increases frequency and severity of floods.	Education & Awareness	Land Use Staff	\$0 - \$10,000	Municipal Operating Budget	7/2023 - 12/2023	Low	14	6	84