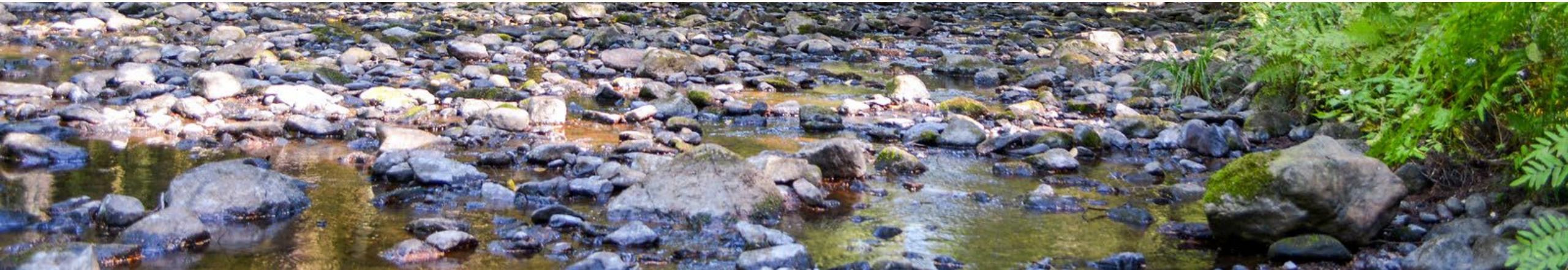
Sussex County Multi-Jurisdictional Hazard Mitigation Plan 2025 Update

Planning Partnership Risk Assessment Meeting
April 11, 2024

While waiting for the meeting to start, please enter your name, title, and department/agency in the chat.

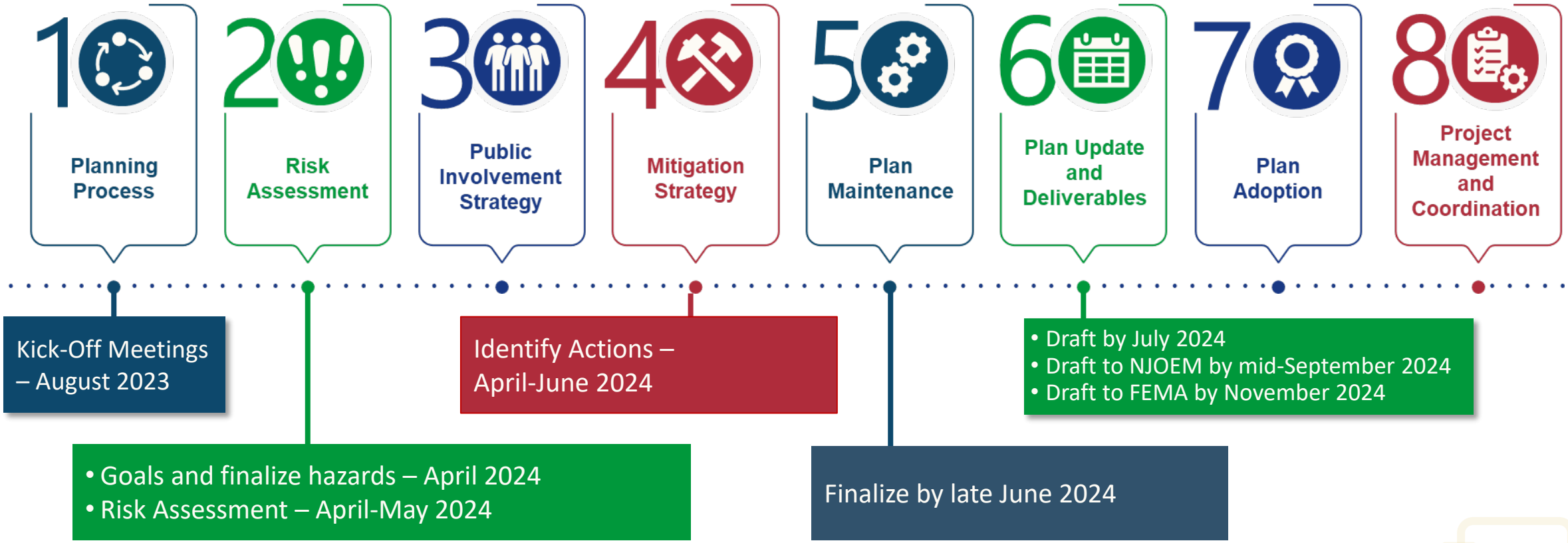
Today's Agenda

1. Welcome and Introductions
2. Project Status
3. Risk Assessment Overview
4. Feedback and Input
5. Next Steps
6. Questions/Wrap Up



Project Status

Schedule


1
Planning Process
2
Risk Assessment
3
Public Involvement Strategy
4
Mitigation Strategy
5
Plan Maintenance
6
Plan Update and Deliverables
7
Plan Adoption
8
Project Management and Coordination
Kick-Off Meetings – August 2023
• Goals and finalize hazards – April 2024
• Risk Assessment – April-May 2024
Identify Actions – April-June 2024
Finalize by late June 2024
• Draft by July 2024
• Draft to NJOEM by mid-September 2024
• Draft to FEMA by November 2024

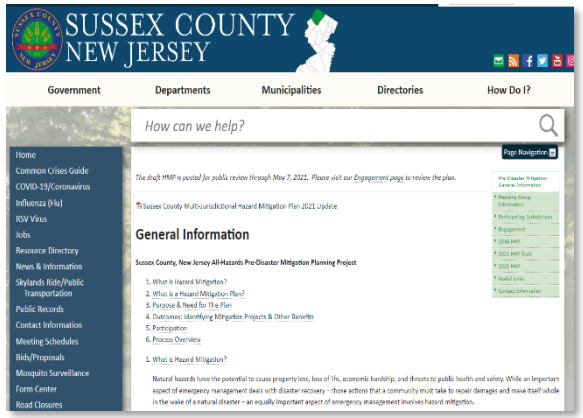
Municipal Participation Status

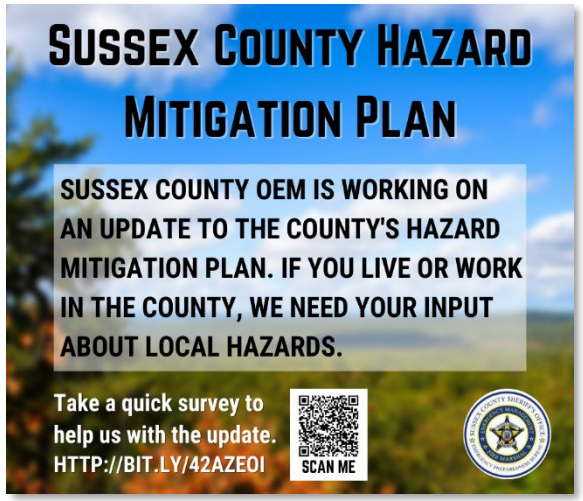
- To date, we have not received all municipal worksheets. Your assigned Tetra Tech planner will be sending a summary of information needed.

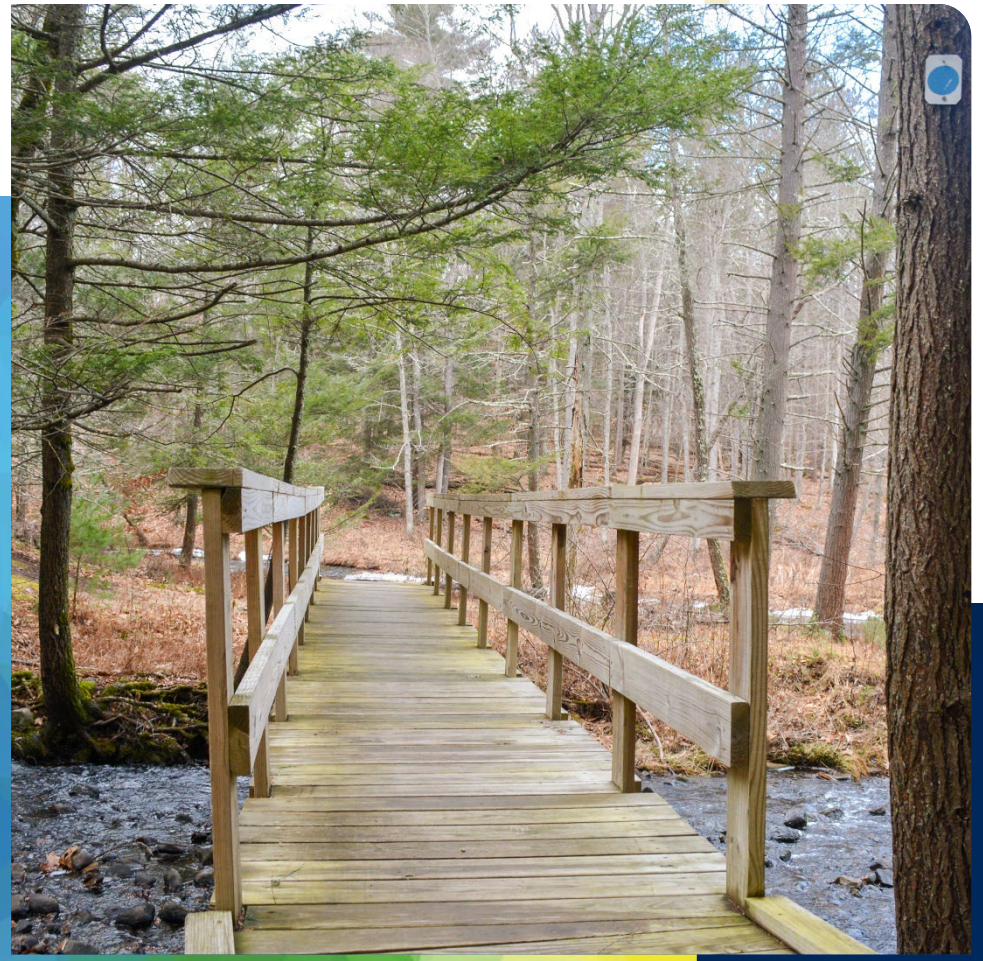
Municipality	Assigned Planner	Municipality	Assigned Planner	Municipality	Assigned Planner
Andover (B)	Grace	Hamburg (B)	Grace	Sandyston (Twp)	Jessica
Andover (Twp)	Grace	Hampton (Twp)	Grace	Sparta (Twp)	Jessica
Branchville (B)	Grace	Hardyston (Twp)	Grace	Stanhope (B)	Jessica
Byram (Twp)	Grace	Hopatcong (B)	Grace	Stillwater (Twp)	Jessica
Frankford (Twp)	Grace	Lafayette (Twp)	Jessica	Sussex (B)	Jessica
Franklin (B)	Grace	Montague (Twp)	Jessica	Vernon (Twp)	Jessica
Fredon (Twp)	Grace	Newton (T)	Jessica	Walpack (Twp)	Jessica
Green (Twp)	Grace	Ogdensburg (B)	Jessica	Wantage (Twp)	Jessica

Public Outreach Strategy

- Public Outreach Toolkit
  - Social media templates and posts
  - Press release templates
  - Printable materials
- Surveys
  - Stakeholders
  - Neighboring communities
  - Public
- County Website
- StoryMap







Risk Assessment Overview

What is Risk?

Risk is defined as a function of :

- Hazard
  - Source of potential danger or adverse condition
- Exposure
  - Manmade or natural features that are exposed to the hazard
- Vulnerability
  - Damage susceptibility of the exposed features
- Adaptive Capacity (or capability)
  - Plans/policies
  - Response/recovery
  - Financial resources

Purpose of Risk Assessment

- To get a better understanding of the risks you face
- Initial results based on available data
- Quantitative data (population/structures exposed, structural damages within hazard zones) used when available
- Qualitative community input (such as unmapped flood areas) integrated to adjust results
- Local community input to adjust relative rankings

Preliminary Risk Assessment Results

Dam Failure

Dam failures in Sussex County are a low-probability and high-consequence event. A dam failure can have devastating impacts on the County. While most dams have storage volumes small enough that failures would have little or no consequences, dams with large storage amounts could cause significant flooding downstream.

Number of Dams

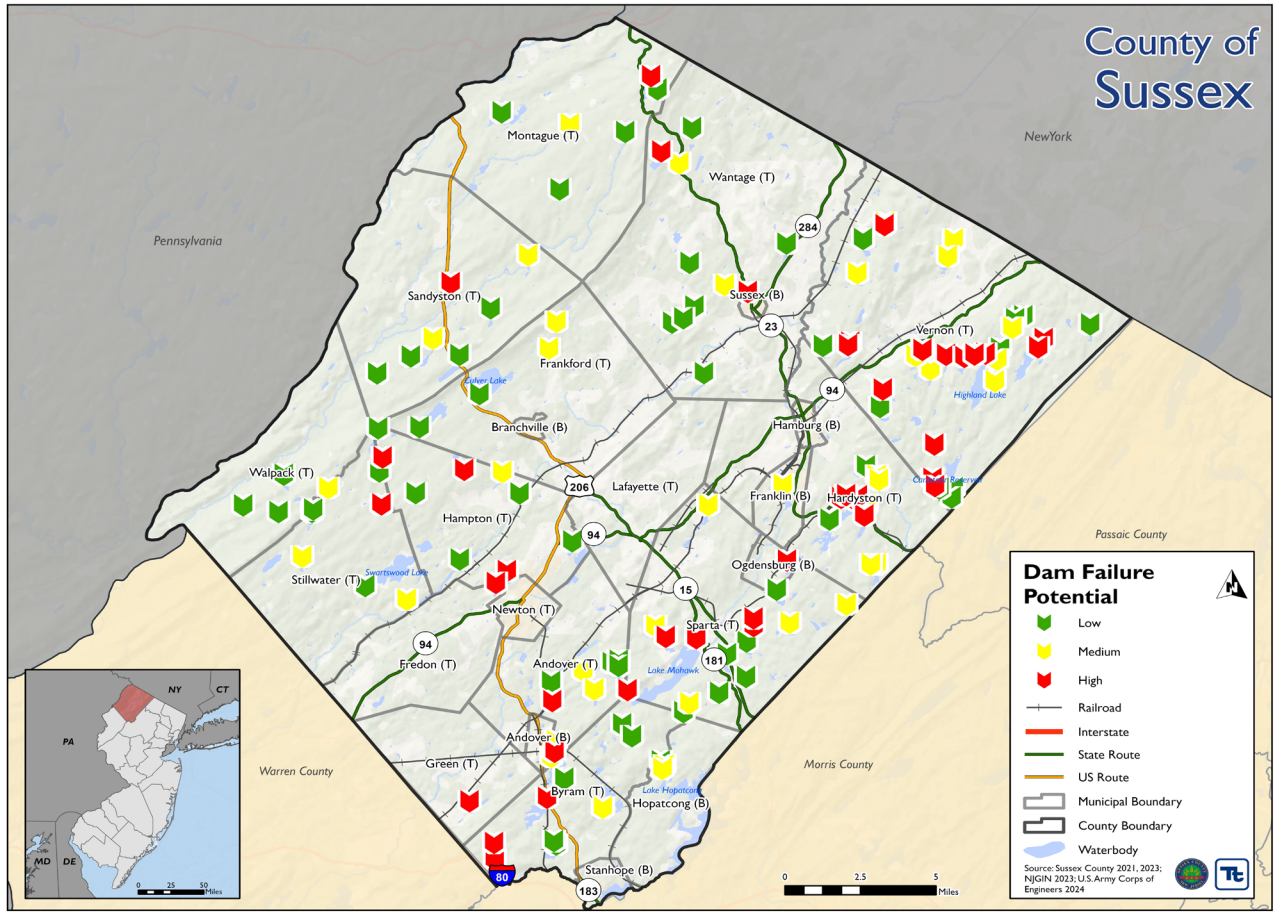
139

- 40 High Hazard
- 39 Significant Hazard
- 60 Low Hazard

Impacts

- Dam failure can cut evacuation routes, limit emergency access, and/or create isolation issues.
- Severe flooding that follows a dam failure can cause extensive structural damage and withhold essential services.
- The environmental impacts of a dam failure can include significant water-quality and debris-disposal issues or severe erosion that can impact local ecosystems.

Dams by Class in Sussex County



Notable Occurrence

On August 11-14, 2000, Heavy thunderstorms produced record amounts of rain, exceeding 14 inches in 4 days. Subsequent flooding completely destroyed the dams on Seneca Lake, Tomahawk Lake, Furnace Pond and Edison Pond in Sussex County, and caused damage to numerous other dams. Several bridges in the Township of Sparta and Borough of Ogdensburg collapsed.

Disease Outbreak

Disease outbreaks can impact the entirety of Sussex County. Emerging diseases are difficult to contain or treat and present significant challenges to risk communication since the mechanics of transmission, laboratory identification, and effective treatment protocols may be unknown.

Population Exposed

144,221

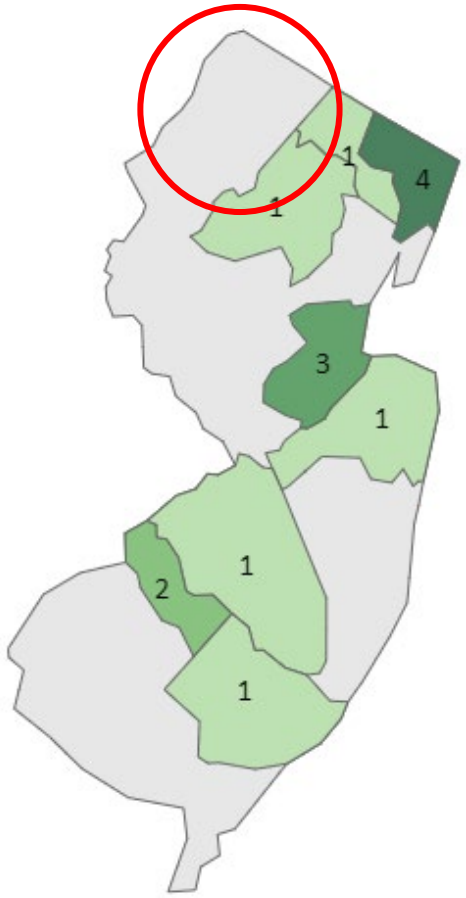
(100%)

The entire County is susceptible

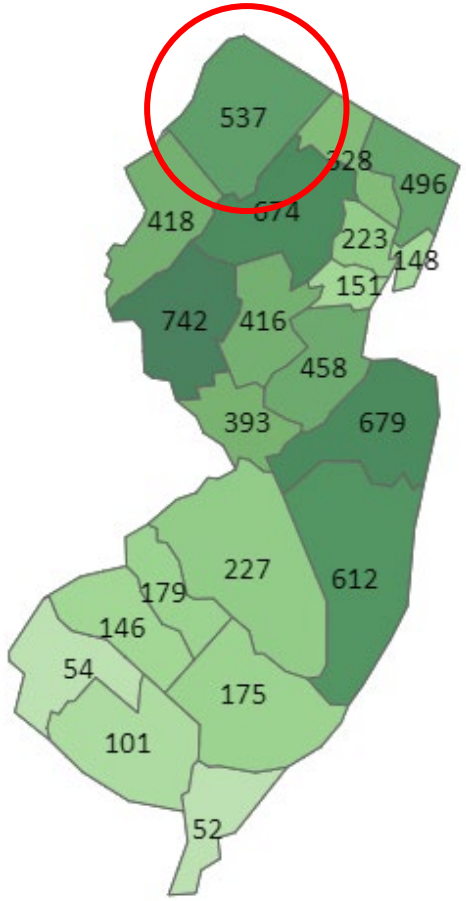
Notable Occurrences

- In 2023, there were 539 confirmed cases of Lyme Disease.
- Since March 2020, Sussex County reported 38,996 positive cases of COVID-19 and 437 deaths.

West Nile Virus Cases by County, 2023



Lyme Disease Cases by County, 2023



Hazard Types

- West Nile Virus
- Eastern Equine Encephalitis
- St. Louis Encephalitis
- Lyme Disease
- Influenza
- Ebola Virus
- Coronavirus

Drought

Droughts can affect Sussex County's industries and make day to day tasks more difficult to complete when water usage must be monitored.

Population Exposed

144,221

(100%)

The entire County is susceptible

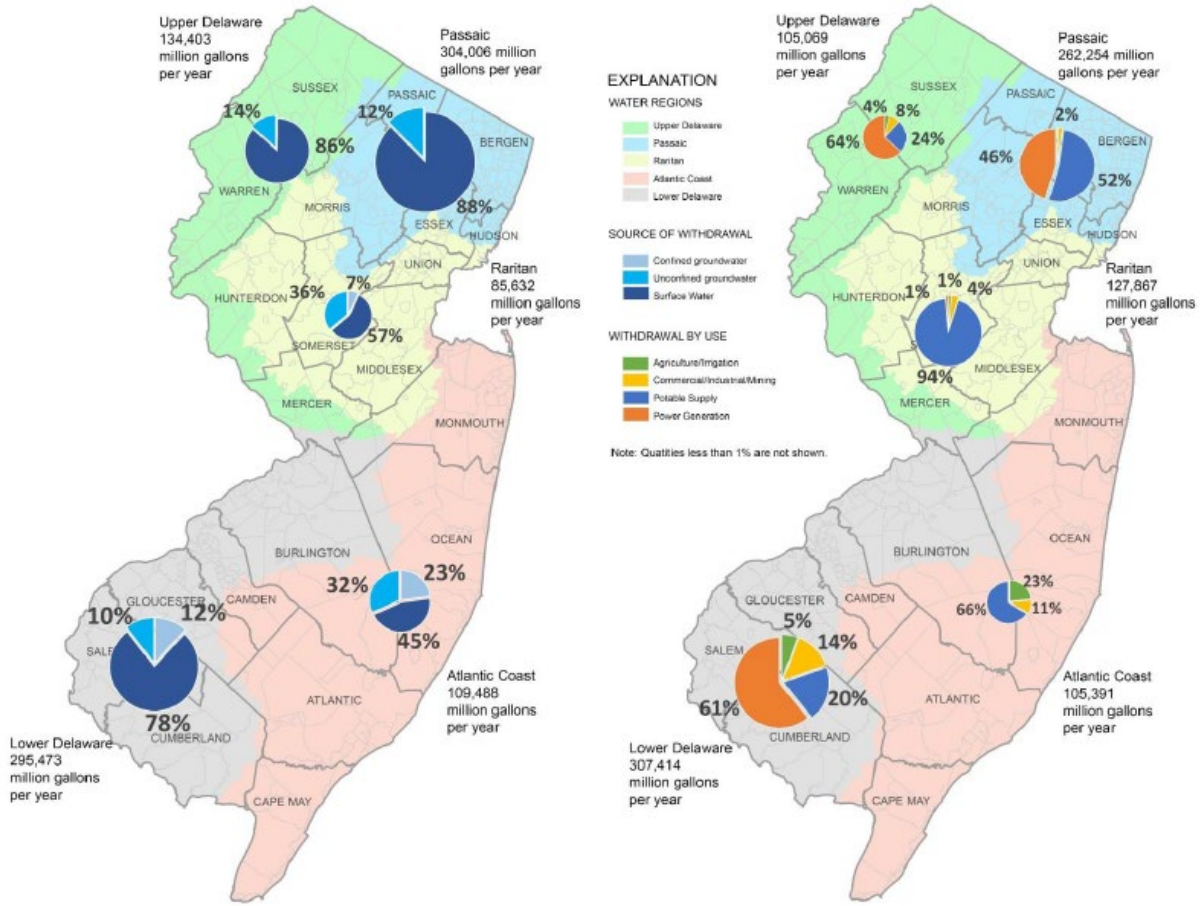
Drought Monitor, 2020-2023

- Abnormally dry conditions experienced 7 times.
- Moderate drought conditions experienced 4 times.
- 2 Statewide droughts.

Climate Change Impacts

It is anticipated that droughts lasting 3 to 6 months and longer may slightly increase in frequency under a low emissions scenario and will significantly increase under a high emissions scenario.

Water Regions, Sources and Withdrawal by Sector in New Jersey



Hazard Types

Meteorological

Hydrological

Agricultural

Socioeconomic

Earthquake

Earthquakes in Sussex County are a low-probability and high-consequence event. An earthquake can have devastating impacts on the County. Ground shaking can lead to the collapse of buildings and bridges and disrupt gas lines, electricity, and phone service.

Population Exposed

144,221

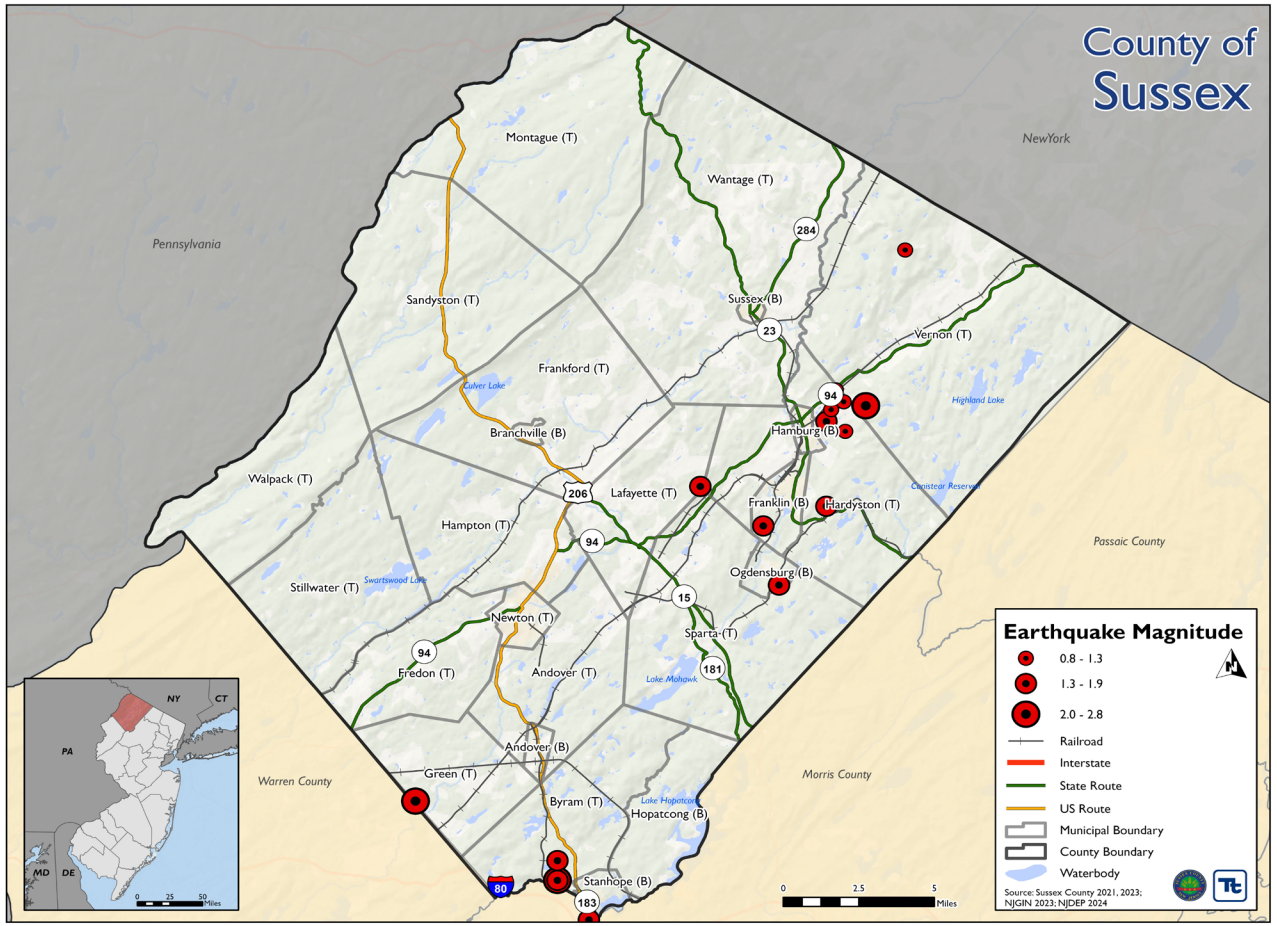
(100%)

The entire County is susceptible

Notable Occurrences

Small earthquakes may occur several times a year and generally do not cause significant damage. The strongest earthquake with an epicenter in Sussex County was a 2.8 quake in Tranquility in November 1986.

Previous Earthquakes with Epicenters in Sussex County



Hazard Types

- Surface Faulting
- Ground Motion
- Liquefaction
- Tectonic Deformation

Recent Earthquakes

On September 9, 2020, a magnitude 3.1 earthquake in Marlboro, NJ was faintly felt in Sussex County.

On April 5, 2024, a magnitude 4.8 earthquake near Lebanon, NJ was felt in Sussex County.

Flood

Floods can happen almost anywhere in County but tend to occur in and around areas near existing bodies of water. Sloped land in the County results in flowing water moving down steeper gradients and being naturally or artificially channelized through valleys and gullies.

Population Exposed

682

In 1% Annual Chance Flood Area

856

In 0.2% Annual Chance Flood Area

Number of Buildings Exposed

462

In 1% Annual Chance Flood Area

562

In 0.2% Annual Chance Flood Area

Flood Building Replacement Cost Value

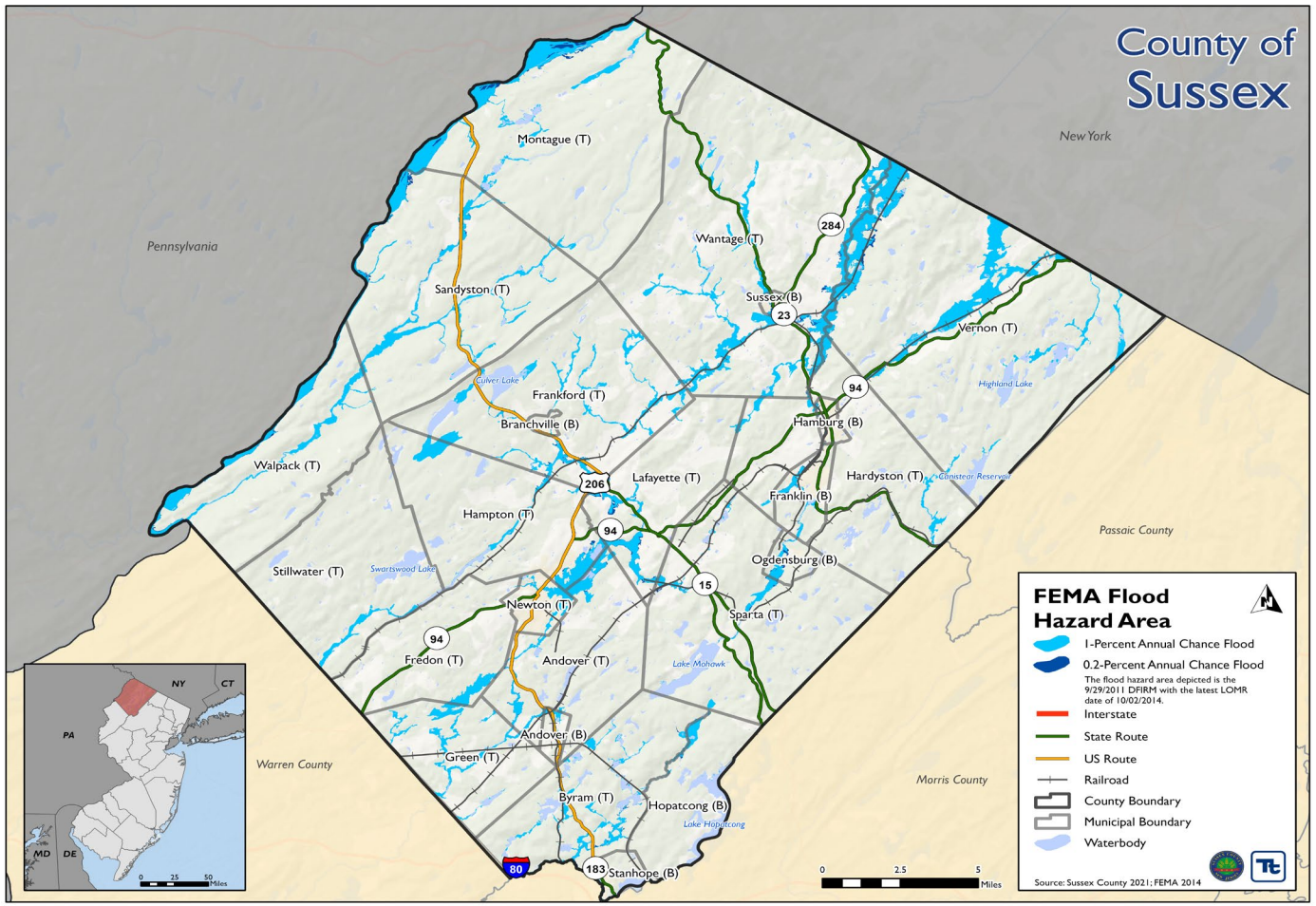
$968,515,095

In 1% Annual Chance Flood Area

$1,053,397,709

In 0.2% Annual Chance Flood Area

Location



Hazard Types

- Riverine / Inland
- Flash Flood
- Urban / Stormwater
- Coastal
- Ice Jam

Land Exposed to Flood Hazard

72,903

acres

Geological Hazards

Landslides and subsidence sinkholes are common in the State of New Jersey, primarily in northern regions. Expansion of urban and recreational developments into hillside areas exposes more people to the threat of landslides each year.

Population Exposed

41,329
In areas with carbonate karst soils

144,221
Within 0.25-miles of abandoned mines

20,921
In areas with >20% grade

16,335
In areas with 15% - 20% grade

Building Replacement Cost Value

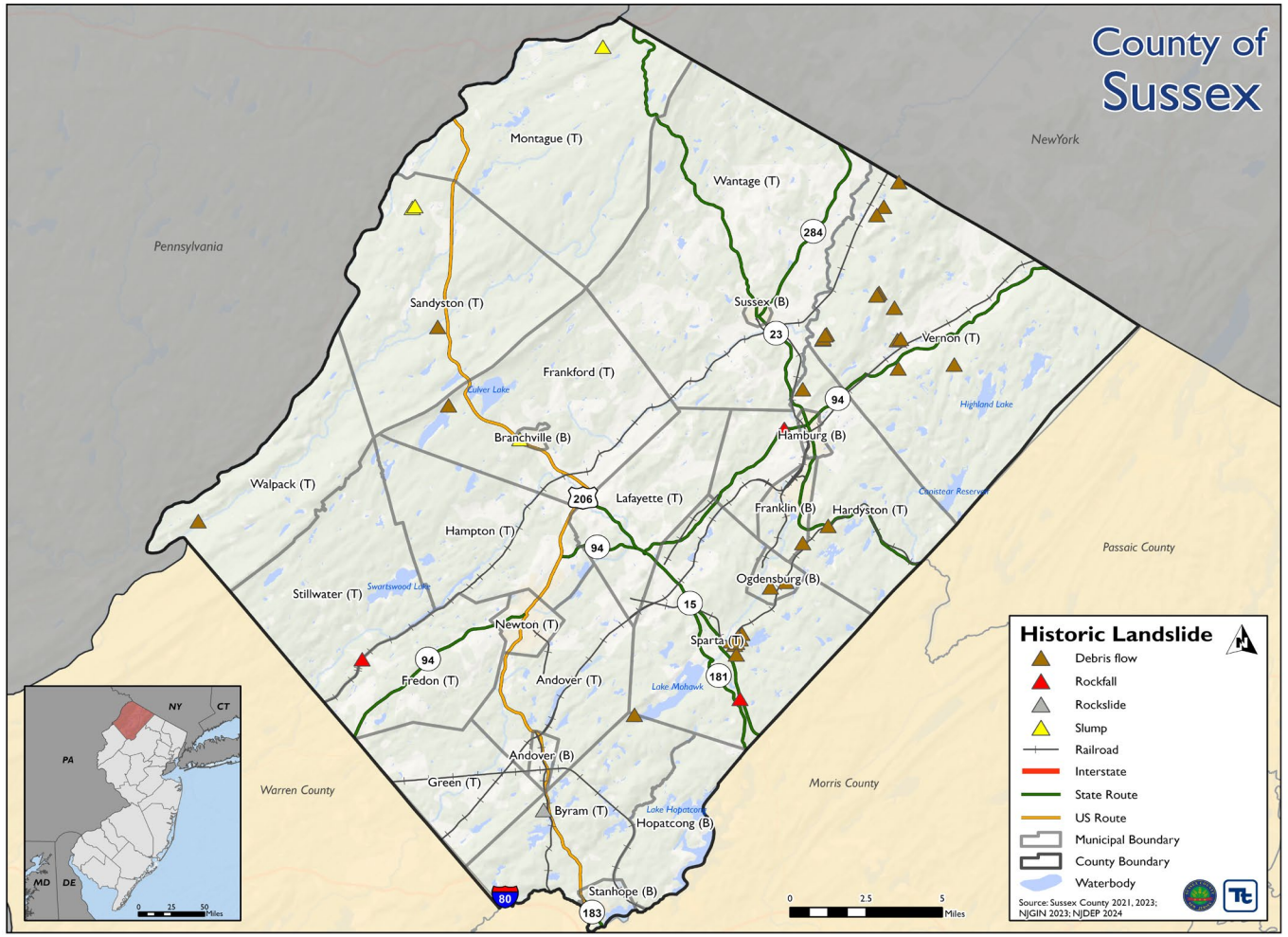
20,634
In areas with carbonate karst soils

3,035
Within 0.25-miles of abandoned mines

10,107
In areas with >20% grade

7,714
In areas with 15% - 20% grade

Historic Landslides in Sussex County



Hazard Types

Land Subsidence

Landslide

Urban Karst / Sinkhole

Climate Change Impacts

Projected increases in precipitation events may result in the oversaturation of the ground causing it to become unstable.

Hazardous Materials

Though hazardous materials incidents are considered rare events, the impacts which the County would experience could be detrimental to the economy, transportation, and in some cases the environment.

Population Exposed

26,521
Within a Mile of a Hazardous Site

19,930
Within a Mile of Hazardous Materials Rail Routes

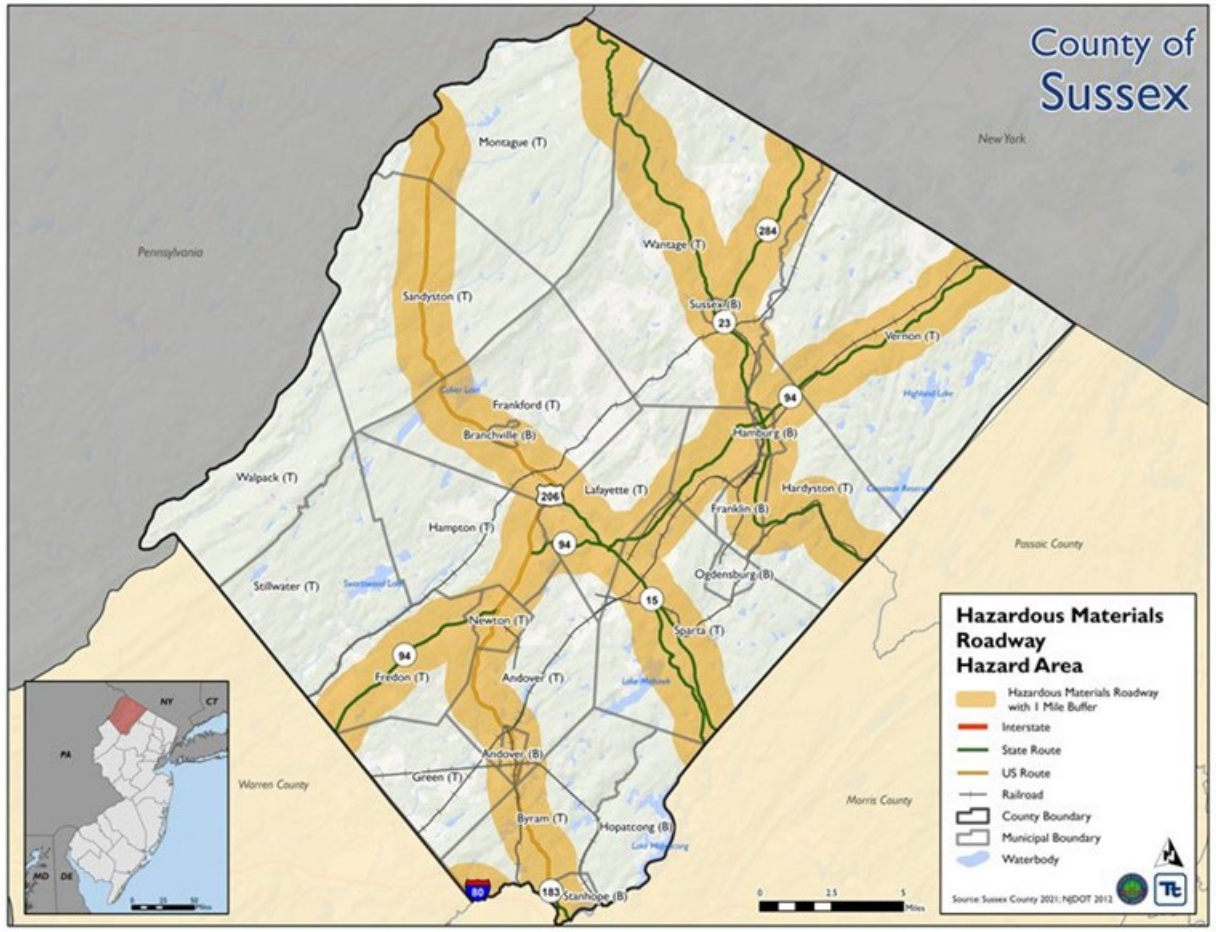
68,535
Within 1 mile of Hazardous Materials Roadway Routes

142,717
Within 50 Miles of Indian Point Energy Center

Notable Occurrences

Between 2020 and 2022, over 580 pounds of Ethylene oxide and Lead were released at on-site facilities in Sussex County.

Major Roadways with 1 Mile Buffer



Hazard Types

- Hazardous Materials Site
- Hazardous Materials Rail Routes
- Hazard Materials Road Routes
- 50-Mile Incidence Area for Indian Point Center

Climate Change Impacts

As temperatures change, excessive heat on aging structures and/or infrastructure may be adversely affected. Excessive heat on structures or containers containing hazardous materials may alter the material properties. In addition, hazardous substances stored at fixed locations in the floodplain may experience an increase in flood events.

Hurricane

Sussex County is not located along the Atlantic Coast, but hurricanes and tropical storms can track inland, bringing heavy rainfall, strong winds, and flooding. These regional events can impact very large areas, hundreds to thousands of miles across over the life the storm.

Population Exposed

144,221

(100%)

the entire County is susceptible

Estimated Building Losses

$25,580,551

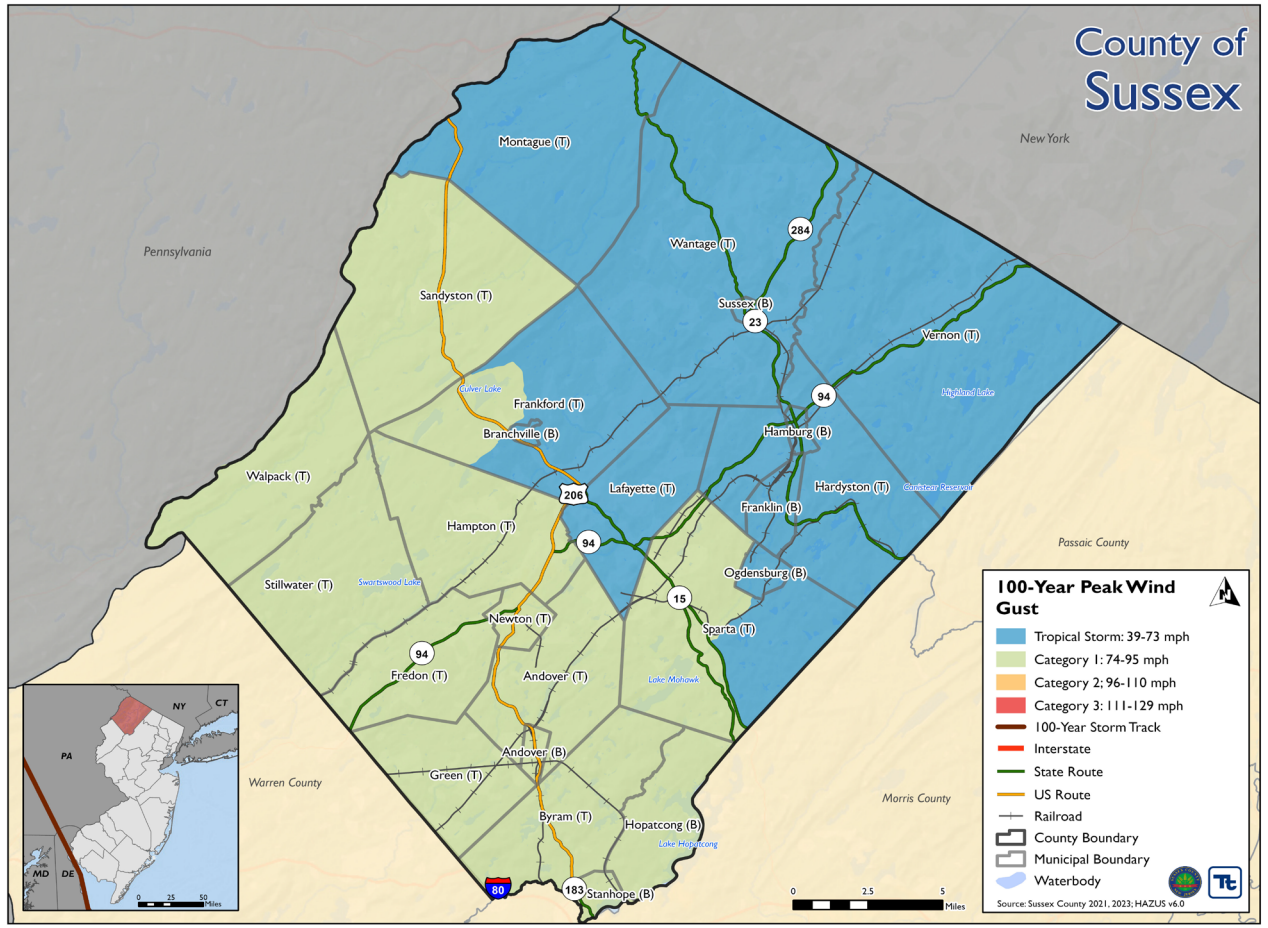
for the 100-Year Mean Return Period Hurricane Wind Event

Tons of Tree Debris

4,230

for the 100-Year Mean Return Period Hurricane Wind Event

Wind Speeds for the 100-Year Mean Return Period Hurricane Wind Event



Notable Occurrence

Tropical Storm Isaias brought high winds, heavy rain, several tornadoes, and coastal flooding to the mid-Atlantic region in August 2020, becoming the most impactful tropical cyclone to impact most of the region since Sandy in 2012. Several reports of downed trees and power lines were made.

Climate Change Impacts

Warming ocean waters are predicted to result in more powerful tropical systems though it is unknown if the frequency of tropical systems will increase. The typical hurricane season may lengthen. Steering currents that move tropical systems once they reach the shoreline may weaken, leading to more prolonged impacts.

Infestation

Due to Sussex County's landscape diversity, the entire County has the potential to be impacted by each of the species identified. Bodies of water, including Lake Hopatcong, have the potential to be impacted by Harmful Algal Blooms.

Population Exposed

144,221

(100%)

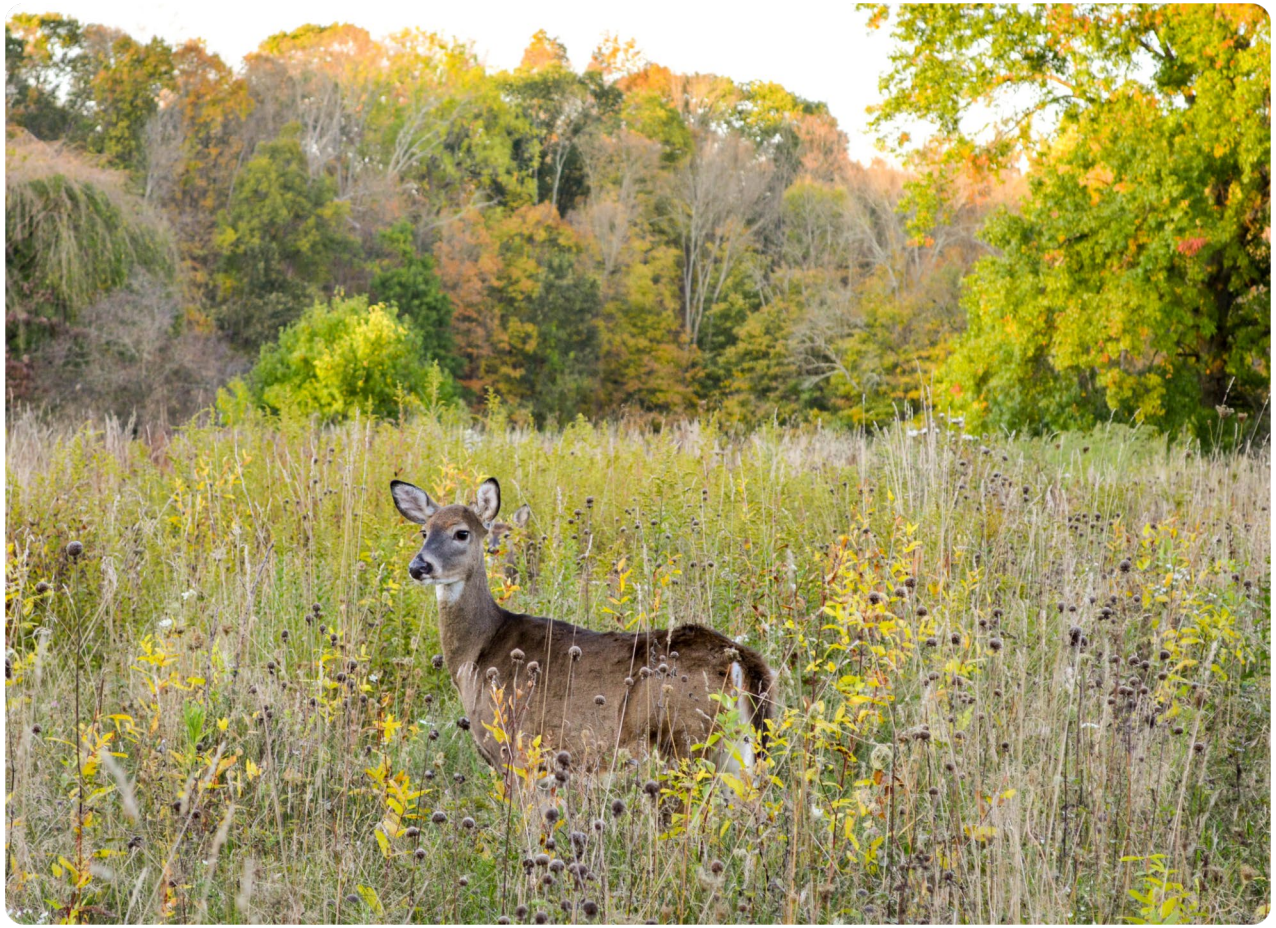
The entire County is vulnerable

Harmful Algal Bloom Alerts

These alerts occurred on the Swartswood Lake, Lake Hopatcong, Lake Owassa, Lake Neepaulin, Lake Musconetcong, and Highland Lake.

Year	Watch	Advisory
2023	12	5
2022	10	15
2021	13	8
2020	9	5

White-Tailed Deer in a Meadow



Hazard Types

Canada Geese

Emerald Ash Borer

Harmful Algal Bloom

Hemlock Woolly Adelgid

Mosquitoes

Spotted Lanternfly

White-Tailed Deer

Climate Change Impacts

A warming climate can foster the spread of invasive species. New species may enter a region in a northern pattern to try and live in a habitat that matches their needs. This will affect food webs and hierarchies in ecosystems which will alter the composition of the typical ecosystem.

Nor’easter

Nor’easters can occur any time of the year but are most frequent and strongest between September and April; these storms have the potential to be life-threatening. It is critical for the community to prepare and be aware of forecasts in their local jurisdictions.

Population Exposed

144,221

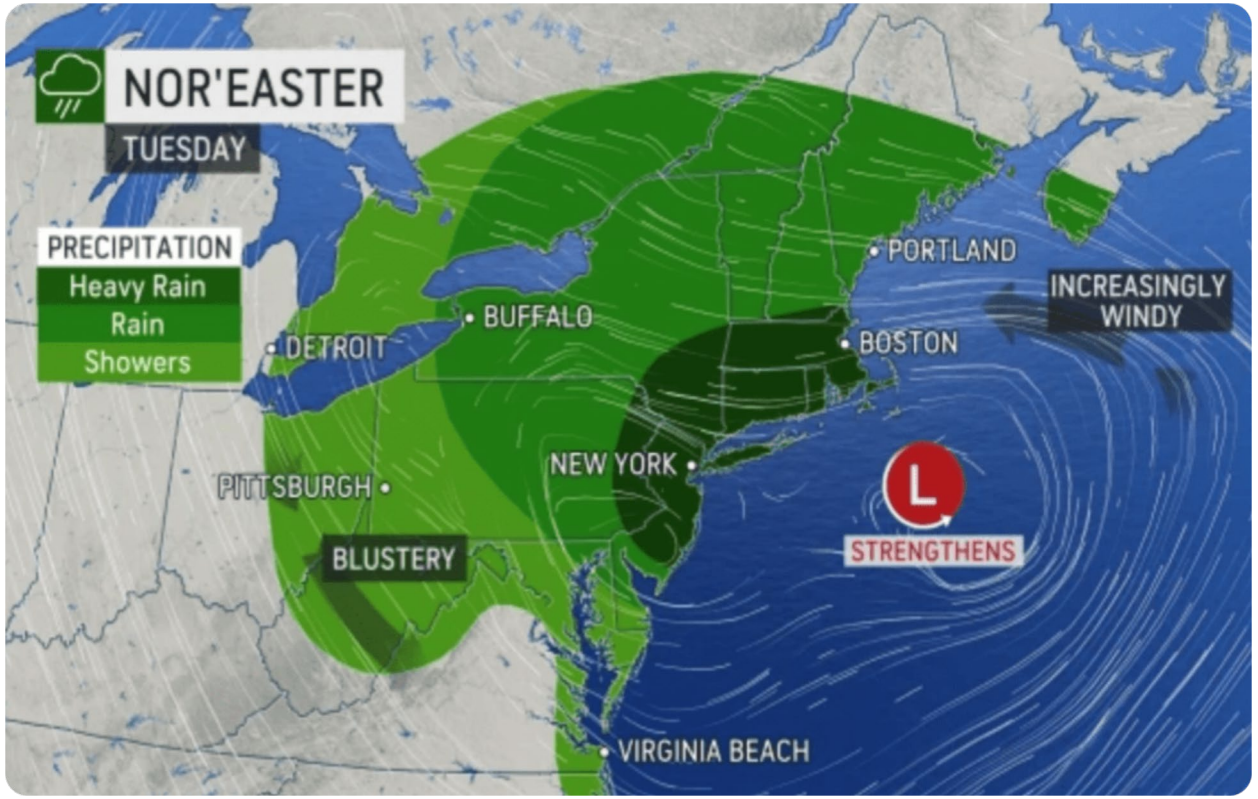
(100%)

The entire County is susceptible

Notable Occurrences

A March 2022 storm produced several inches of accumulating snow. Dropping temperatures led to instances of flash freezing. As the storm moved out to sea, winds increased, exacerbating impacts caused by wet snow, leading to scattered power outages.

Map of Nor’easter Moving up New Jersey Coast



Potential Impacts

- Essential Services Interruptions Power Outages
- Traffic Accidents
- Downed Trees
- Property Damage
- Personal Injury / Loss of Life

Climate Change Impacts

New Jersey has experienced a 3.5° F increase in the State’s average temperature. By 2050, temperatures in New Jersey are expected to increase by 4.1 to 5.7° F. Increases will be more conducive to increased frequency and intensity of severe storms (e.g., thunderstorms, tornados).

Severe Weather

Severe weather can occur anywhere in the County at any time and have the potential to be life-threatening. It is critical for the community to prepare and be aware of forecasts in their local jurisdictions.

Population Exposed

144,221

(100%)

The entire County is susceptible

Notable Occurrences

A July 2021 storm produced strong microbursts. Extensive tree and utility damage were reported. Many trees were reported snapped near Vernon. Power outages were also reported. Wind speeds were estimated to be 70 mph.

Potential Impacts

- Power Outages
- Traffic Accidents
- Downed Trees
- Property Damage
- Personal Injury / Loss of Life

Storm Damage in Stanhope

Hazard Types

- High Wind
- Tornado
- Thunderstorm and Lightning
- Hailstorms
- Extreme Temperatures

Severe Winter Weather

Severe winter weather can occur anywhere in the County and have the potential to be life-threatening. It is critical for the community to prepare and be aware of forecasts in their local jurisdictions.

Population Exposed

144,221

(100%)

The entire County is susceptible

Hazard Types

- Heavy Snow
- Blizzard
- Ice Storm
  - Sleet
  - Freezing Rain

January 31 – February 2, 2021 Snow Event

Notable Occurrence

A winter storm in early 2021 resulted in reports of 24 inches to 32 inches of snow across Sussex County.

Climate Change Impacts

By 2050, temperatures in New Jersey are expected to increase by 4.1 to 5.7° F. The increase in temperatures is expected to be felt more during the winter months, resulting in less intense cold waves, fewer sub-freezing days, and less snow accumulation.

Wildfire

Wildfire events in Sussex County typically occur toward the forested portions of the County, such as Stokes State Forest. Wildfires can have impacts on critical services, utilities, and properties, and may cause injury.

Population Exposed

2,834

(2%)

of the County is susceptible

Building Replacement Cost Value

$2,372,327,088

In Extreme, Very High, or High Wildfire Fuel Risk Hazard Area

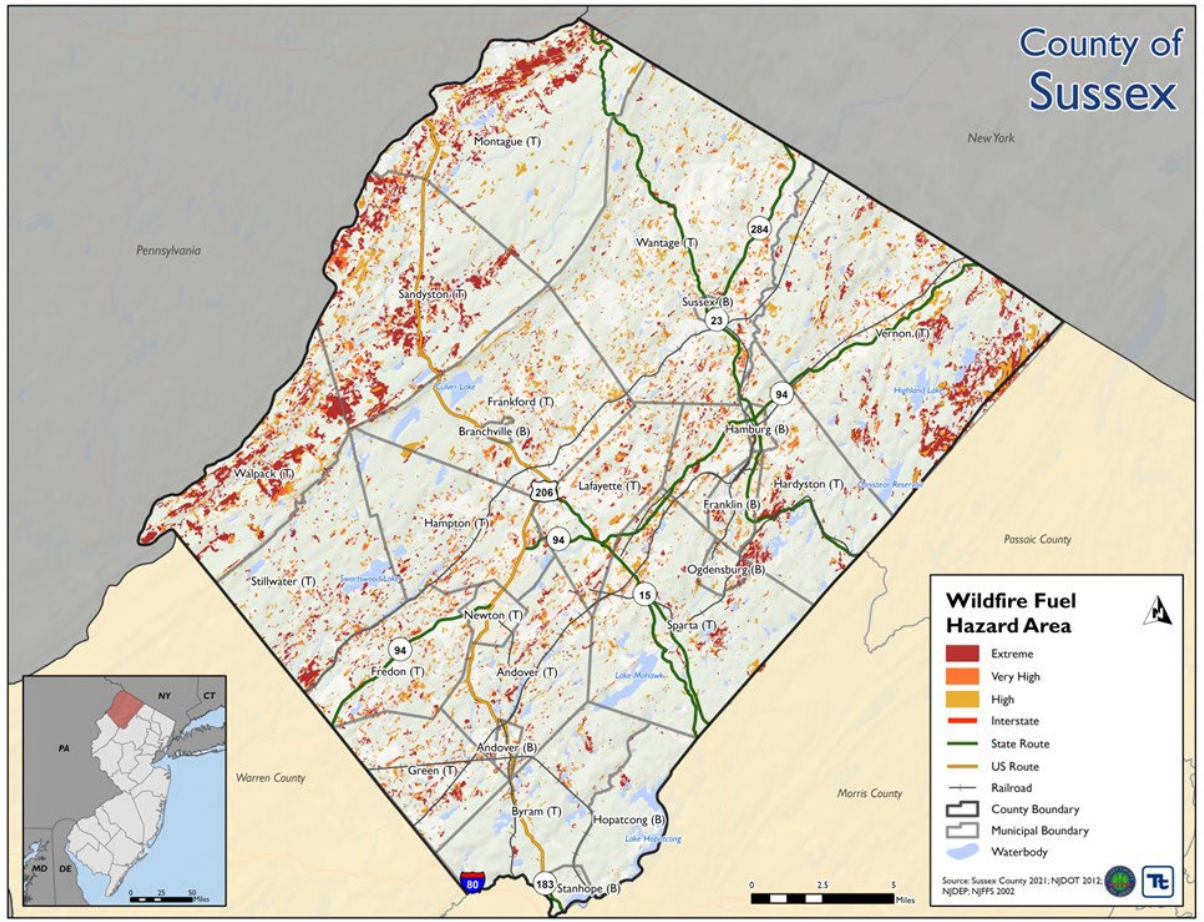
Number of Buildings Exposed

1,494

(2.1%)

In Extreme, Very High, or High Wildfire Fuel Risk Hazard Area

Location



Notable Occurrence

On May 12, 2015 a wildfire started shortly after 530 p.m. In addition to a home being destroyed, the wildfire consumed more than 6 acres before it was brought under control about 3 hours later.

Climate Change Impacts

Sussex County can expect warmer and drier conditions which may increase the frequency and intensity of wildfires. Higher temperatures are expected to increase the amount of moisture that evaporates from land and water. These changes have the potential to lead to more frequent and severe droughts, which, in turn, increases the likelihood of wildfires.

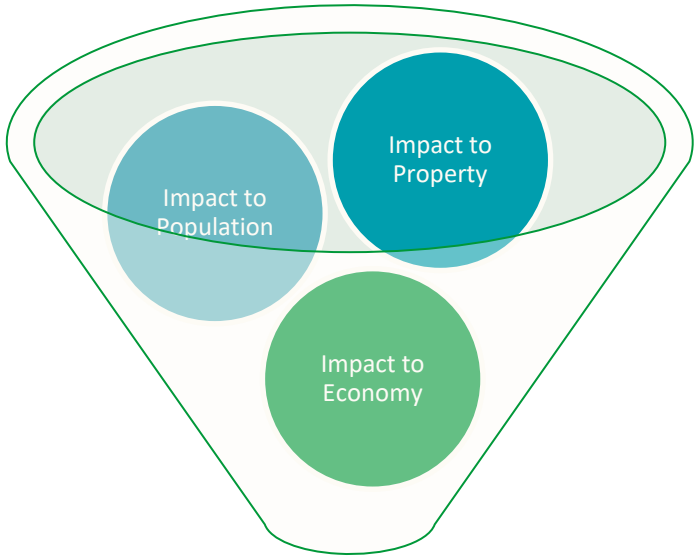
Hazard Rankings

Review the calculated hazard rankings and provide your feedback.

Preliminary Hazard Ranking Methodology

- The calculated probability of a hazard occurring based on historical data
- *Impacts to people, property, and the economy* based on GIS data and analysis of exposure.
- The degree to which *climate change* will affect future occurrences based on best available data.
- The degree to which existing *capabilities* (the ability of your community to respond to the hazard based on ordinances, mitigation strategies and procedures, and readiness) decrease overall risk.

Preliminary Hazard Ranking Formula



Local community input to adjust preliminary rankings

Probability of Occurrence (30%) + Impacts (30%) + Adaptive Capacity (30%) + Climate Change (10%) → Preliminary Hazard Ranking

Preliminary Risk Ranking (County)

High

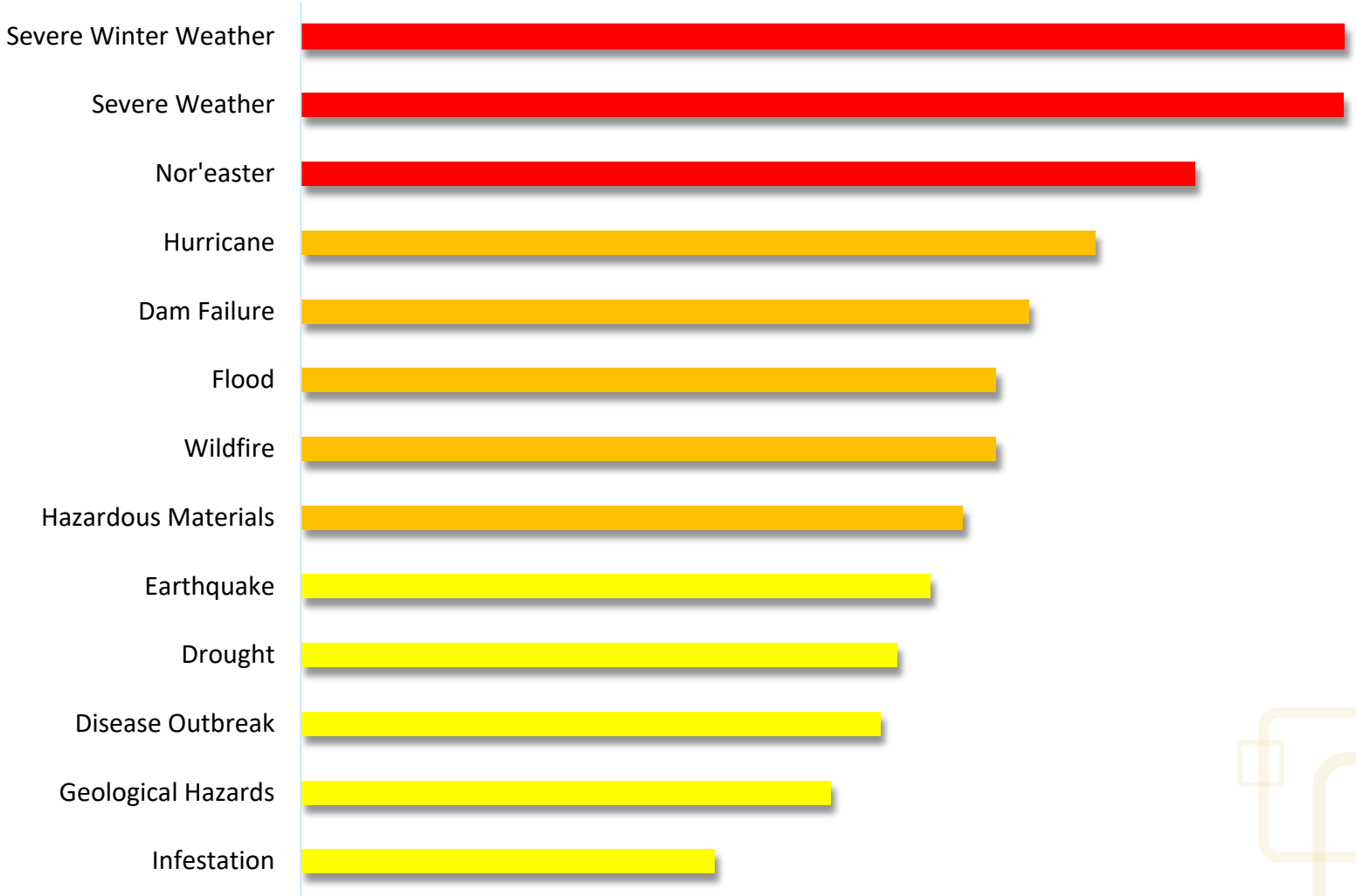
- Severe Winter Storm
- Severe Weather
- Nor’easter

Medium

- Hurricane
- Dam Failure
- Flood
- Wildfire
- Hazardous Materials

Low

- Earthquake
- Drought
- Disease Outbreak
- Geological Hazards
- Infestation



Review Preliminary Rankings

Review Preliminary Rankings

Please send all electronic Word versions by April 19, 2024 to:
Grace Altenburg, Tetra Tech | Grace.Altenburg@tetratech.com

Jurisdiction: _____

Name/Title of Individual Completing Worksheet: _____

_____

What is a Hazard Ranking?

Hazard Ranking is used to understand your community's vulnerabilities to hazards and to prioritize projects and activities for mitigation.

Hazard Ranking is determined by quantitative and qualitative factors including:

1. The calculated probability of a hazard occurring based on historical data.
2. Impacts to people, property, and the economy based on GIS data and analysis of exposure.
3. The degree to which climate change will affect future occurrences based on best available data.
4. Adaptive Capacity, which is the ability your community has to respond to the hazard based on ordinances, mitigation strategies and procedures, and readiness.

What is my Hazard Ranking?

The following table represent the calculated rankings for the hazards of concern for your community. Please review the calculated rankings and indicate whether or not you want to adjust the ranking. If you are changing the ranking, please provide detail as to why you are changing the ranking. *REMEMBER, for every hazard of concern, you need at least one mitigation action.*

Continued on next page.

Sussex County | Hazard Mitigation Plan 2025 Update
Risk Ranking Worksheet

Table 1. 2025 HMP Municipal Hazard Rankings

Hazard	Draft 2025 Preliminary Ranking	Agree with preliminary ranking (Y/N)? If No, indicate preferred ranking.	What local information or conditions have resulted in the adjustment in hazard ranking?

What is Adaptive Capacity?

Adaptive capacity describes a jurisdiction's current ability to protect from or withstand a hazard event.

- **Weak** adaptive capacity means the jurisdiction does not have the capability to effectively respond, which leads to an increase in vulnerability. Examples include weak/outdated/inconsistent plans, policies, codes/ordinances in place; no redundancies; limited to no deployable resources; limited capabilities to respond; long recovery.
- **Moderate** adaptive capacity means minimum requirements are in place; moderate capabilities; mitigation measures are identified but not implemented widespread; jurisdiction can recover but needs outside resources.
- **Strong** adaptive capacity means the jurisdiction does have the capability to effectively respond, plans/policies exceed minimum requirements; deployable resources all of which decreases vulnerability.

Table 2. 2025 HMP Municipal Adaptive Capacity

Hazard	Preliminary Ranking	What should we indicate for your community's adaptive capacity for each hazard?

*Note: *Adaptive capacity was assumed Moderate for all hazards.*

Next Steps

- Share information about the HMP Update via social media, community groups, and networks
- Attend the Mitigation Strategy Workshop on Wednesday, May 8 @ 10:00 a.m. in person (location to be determined).

Questions?

Sussex County Project Contacts

Steven Sugar, Deputy Coordinator
973-579-0380 x 2531 | ssugar@sussexcountysheriff.com

James Aumick, Deputy Coordinator
973-579-0380 x 2531 | jaumick@sussexcountysheriff.com

Tetra Tech Project Contacts

Chris Huch, CFM | Project Manager
(973) 630-8357 | chris.huch@tetratech.com

Jessica Stokes, MSEM, NJCEM | Lead Planner
(973) 630-8017 | jessica.stokes@tetratech.com

Thank You!