

Bucks County

Hazard Mitigation Plan Update

Risk Assessment and Mitigation Solutions

April 29, 2025
11:00 a.m. and 7:00 p.m.



Welcome!

Matthew Walters

Senior Planner

Bucks County Planning Commission

Deanna Miller

Planner/Recycling Coordinator

Bucks County Planning Commission

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Consultant Project Manager

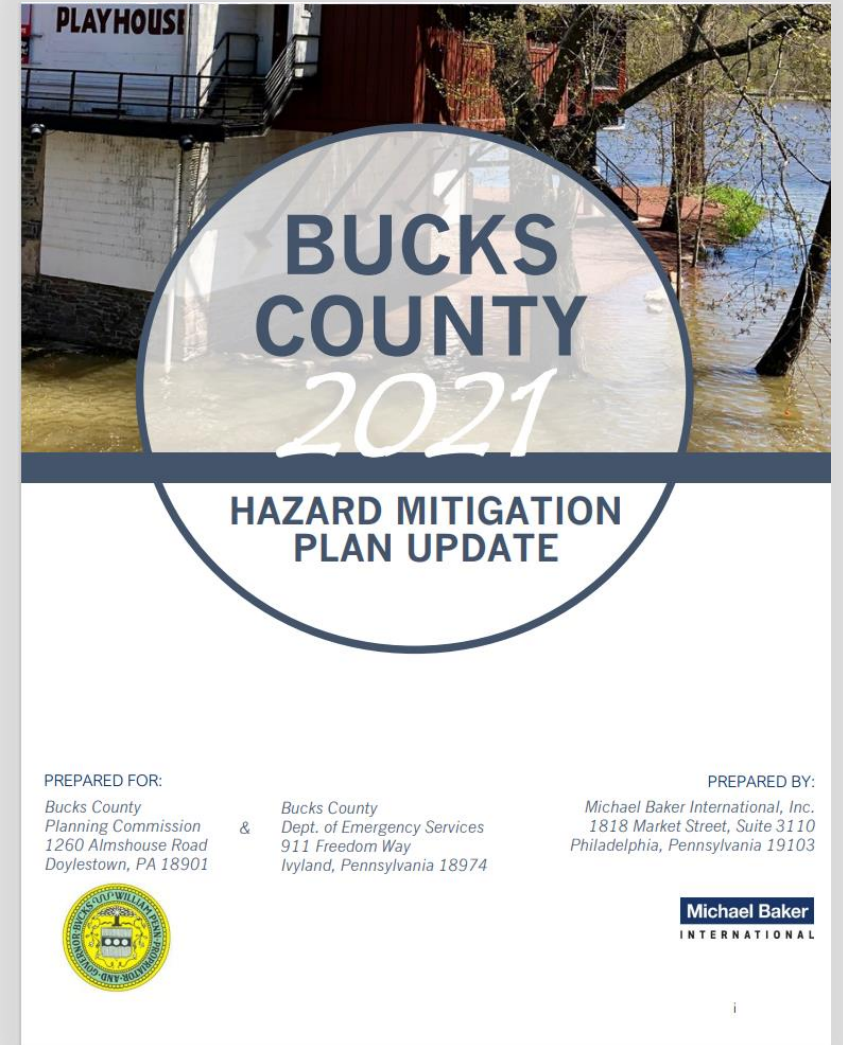
Michael Baker International, Inc.

Michael Baker
INTERNATIONAL



Agenda

1. Project Update
2. 2026 Update – Hazard Identification
3. Risk Assessment
 - Process
 - Hazard Identification
 - Participant Feedback
 - Vulnerability and Risk Analysis
4. Next Steps
 - Project Schedule
 - Action Items



The last update for Bucks County Hazard Mitigation Plan expires October 3, 2026.



Please let us know you are here!

Submit your name and municipality:

1. Using the WebEx "Chat"

or

2. Emailing Jessica.Jahre@mbakerintl.com

Project Update

Project Update

Kick Off Meetings

- January 2025 Municipal Kick Off
 - 41 municipalities in attendance
- April 2025 Special Districts Kick Off
 - 7 Special Districts in attendance

Hazard Identification & Risk Assessment

- Hazard Identification Survey – *32 Submitted*

Capability Assessment

- Capability Assessment – *18 Submitted*

Mitigation Strategy

- Develop mitigation strategies



Risk Assessment Process

- Identifies **natural** and **human-made hazards**
- Identify **critical assets** and **systems** that are vulnerable under current and future conditions
- Tell story about Bucks County's risks and link to the **capabilities** and **hazard mitigation actions** of each participant
- Requires considering the effects of **climate change**, **population change**, and **land use change**



For more information on FEMA's community lifelines, visit:
<https://www.fema.gov/emergency-managers/practitioners/lifelines>

Source: FEMA

Hazard Identification

PEMA Profiled Hazards



Source: PA Emergency Management Agency (PEMA)

Other PEMA Profiled Hazards not shown above:

- *Expansive Soils*
- *Disorientation*
- *Drowning*
- *War and Criminal Activity*

Hazards Profiled for 2021 Bucks HMP Update

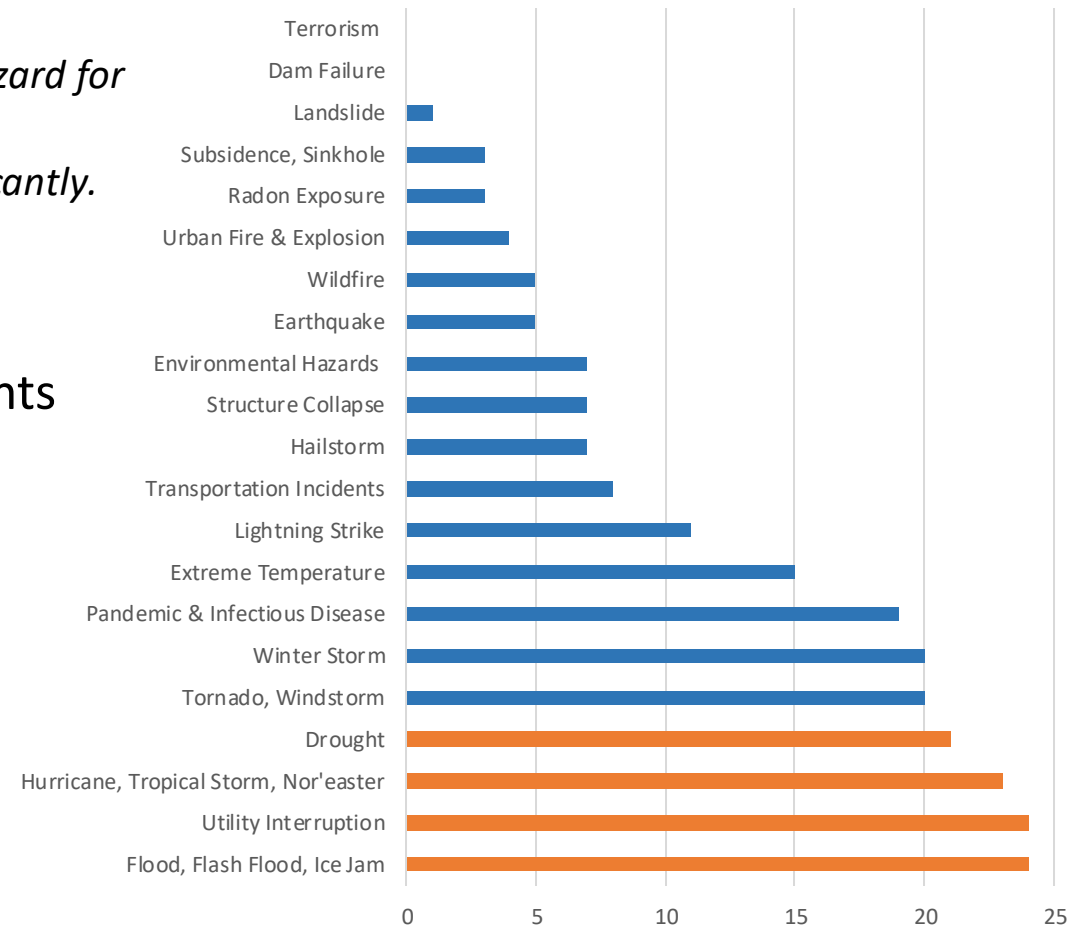


Source: PA Emergency Management Agency (PEMA)

Hazards of Concern

- Top responses received from the Hazard ID Survey:
 - Flood, Flash Flood, Ice Jam (24)
 - Utility Interruption (24)
 - Hurricane, Tropical Storm, Nor'easter (23)
 - Drought (21) - *In 2021, drought was categorized as a moderate hazard for Bucks County, though it ranked as the fourth most common response. Growing drought conditions are expected to impact agriculture significantly.*
- Other hazards identified:
 - Industrial Hazards; including hazardous materials incidents
 - Environmental Hazards including Bedrock Fracture
 - Multi-risk from dead trees
 - Cyber Attack
 - Opioid Addiction

Mention of Hazard in Responses



Hazards – 2026 Bucks County HMP Update

Natural Hazards

- Drought
- Earthquake
- Extreme Temperature
- Flood, Flash Flood, & Ice Jam
- Hailstorm
- Hurricane, Tropical Storm, & Nor'easter
- Landslide
- Lightning Strike
- Radon Exposure
- Subsidence & Sinkholes
- Tornado & Windstorm
- Wildfire
- Winter Storm

Human-Made Hazards

- **Cyber Terrorism**
- Dam Failure
- Environmental Hazards, including hazardous materials
- Gas and Liquid Pipelines
- Pandemic
- Structural Collapse
- Terrorism
- Transportation Accidents
- Urban Fire and Explosion
- Utility Interruption

2026 HMP Profiled Hazards and Rankings

Risk	Hazard	Risk Assessment Category					Risk Factor
		Probability	Impact	Spatial Extent	Warning Time	Duration	
High	Flood, Flash Flood, Ice Jam	4	3	3	4	4	3.5
	Winter Storm	4	2	4	2	3	3.1
	Extreme Temperatures	3	3	4	1	4	3.1
	Hurricane, Tropical Storm, Nor'easter	3	3	4	1	3	3.0
	Environmental Hazards	4	2	2	4	2	2.8
	Wildfire	3	3	2	4	2	2.8
	Pandemic	2	3	4	1	4	2.8
Moderate	Utility Interruption	3	2	3	4	2	2.7
	Transportation Accidents	4	2	1	4	2	2.6
	Gas & Liquid Pipelines	2	3	2	4	3	2.6
	Drought	3	1	4	1	4	2.5
	Tornado & Windstorm	2	3	2	4	2	2.5
	Dam Failure	2	3	2	3	3	2.5
	Urban Fire & Explosion	3	2	1	4	2	2.3
	Terrorism	1	4	1	4	1	2.2
	Lightning Strike	4	1	1	3	1	2.1
	Landslide	3	1	2	2	3	2.1
Low	Structural Collapse	2	2	1	3	3	2.0
	Cyber Terrorism	2	1	3	3	1	1.9
	Earthquake	1	2	2	4	2	1.9
	Radon Exposure	2	1	1	1	4	1.6
	Subsidence & Sinkholes	2	1	1	3	2	1.6
	Hailstorm	2	1	1	1	2	1.4

Changes since 2021

- Flood, Flash flood, Ice Jam increased in risk factor
- Extreme temperatures increased to “High”
- Hurricane, Tropical storm, and Nor’easter increased in risk
- Drought and wildfire increased

County Profile & Vulnerabilities

Population Growth

- Bucks County has seen a growth of about 3.1% over the period between Census ACS Survey periods – 2014-2018 and 2019-2023

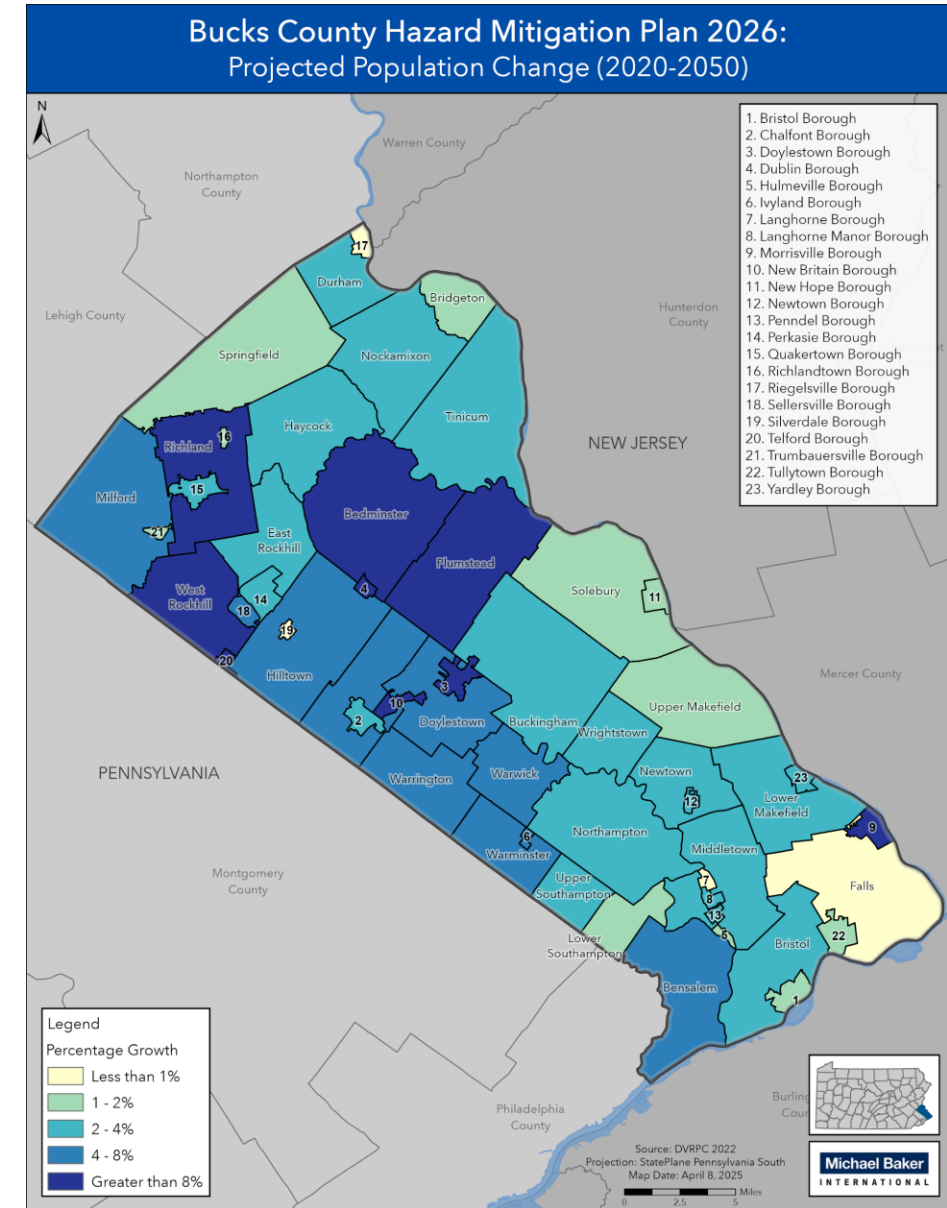
	2014-2018	2019-2023	Percent Change
Bucks County	626,370	645,993	3.13%

- DVRPC estimates that Bucks County will grow an additional 5.1% by 2050

	2015-2050 (Projected)	2015-2050 (Projected)
Bucks County	31,906	5.1%

- Municipalities with the greatest population growth (over 10%):

	2019-2023 Estimate	Percent Change
Silverdale Borough	1,068	42.21%
Tullytown Borough	2,367	23.15%
Bridgeton Township	1,254	14.84%
Newtown Borough	2,234	14.39%
Morrisville Borough	9,740	13.41%



Populations Over Age 65

- Bucks County is getting older – this is on par with Pennsylvania trends as the state is getting older, and aging somewhat more rapidly than Bucks.

	2014-2018	2019-2023	Change
Bucks County	17.61%	19.96%	2.35%
Pennsylvania	15.46%	19.07%	3.61%

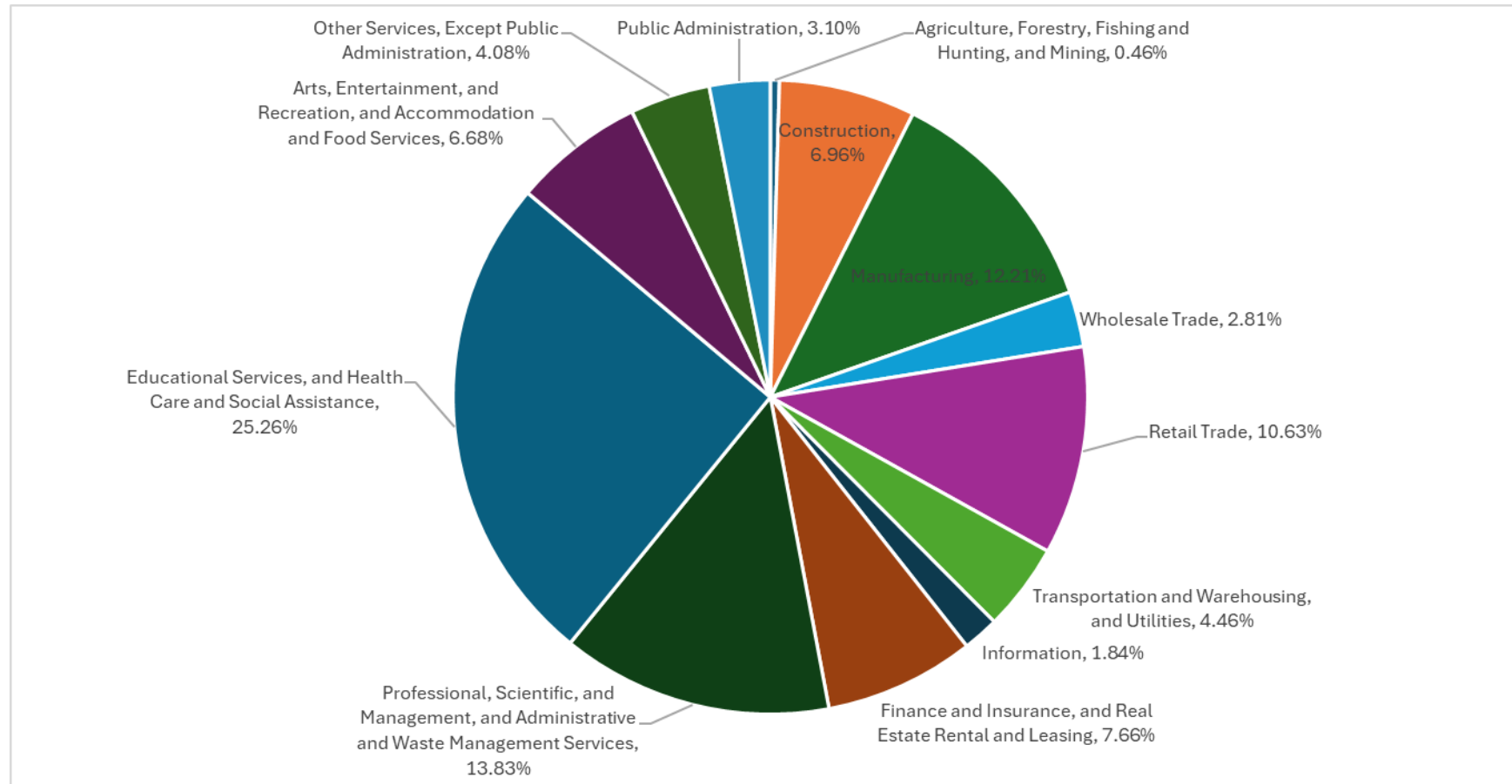
- Populations over 65 (both living independently and in assisted living environments) were mentioned as a specific vulnerability by **15 municipalities**.
- Bucks has a density of older populations in municipalities along the Delaware River.

Municipalities with the Highest Share of Population > 65	
Municipality	Share of Population > 65
West Rockhill	35.9%
Tinicum	35.3%
Solebury	27.9%
Upper Makefield	27.4%

Employment

FEMA emphasizes a disproportionate impact of hazard events on certain industries. A “disproportionate disruption of livelihood” may impact communities and residents long after a hazard event.

Overall, Bucks County employment is relatively diversified, has a growing services industry, and is responding to worker needs for an aging population.



Mobile Home Communities

Municipalities with the Highest Share of Mobile Housing Units	
Municipality	Share of Mobile Housing Units
Richland Township	14.72%
Falls Township	10.35%
Doylestown Township	4.5%
Bucks County (Total)	1.95%

- Mobile homes are particularly vulnerable to natural disasters including floods, high winds, and tornadoes – they are structurally weaker than traditional homes. One in seven mobile homes nationwide is built in a flood prone area, compared to one in ten traditional homes.
- **Three** Bucks County municipalities raised mobile home communities (including trailer parks and manufactured homes) as having a particular vulnerability to flood and extreme-wind hazards.

Disability

- About 11% of Bucks County is living with a disability. This is somewhat lower, and growing less rapidly, than Pennsylvania.

	2014-2018	2019-2023	Change
Bucks County	10.93%	10.95%	.2%
Pennsylvania	13.91%	14.22%	.31%

- Populations who may have particular mobility needs (both living independently and in assisted living environments) were mentioned as a specific vulnerability by **9 municipalities**.
- Assisted living locations are included in critical facilities analysis.

Municipalities with the Highest Share of Population with a Disability	
Municipality	Share of Population with a Disability
Nockamixon Township	17.28%
Bristol Borough	15.74%
Langhorne	15.37%
Bensalem Township	14.50%

Language

- Non-English speaking residents were not identified in the (to-date) Hazard ID Survey responses.
- Bucks County has a growing population of residents that speak a language other than English at home – a larger share, and growing faster, than Pennsylvania.
- Language barriers may increase vulnerability to hazards and disasters, particularly stemming from difficulties receiving crucial information including warnings, hazard preparedness, and emergency or evacuation instructions.

Populations Speaking a Language Other than English at Home			
	2014-2018	2019-2023	Change
Bucks County	11.90%	13.19%	1.29%
Pennsylvania	11.26%	12.05%	.79%

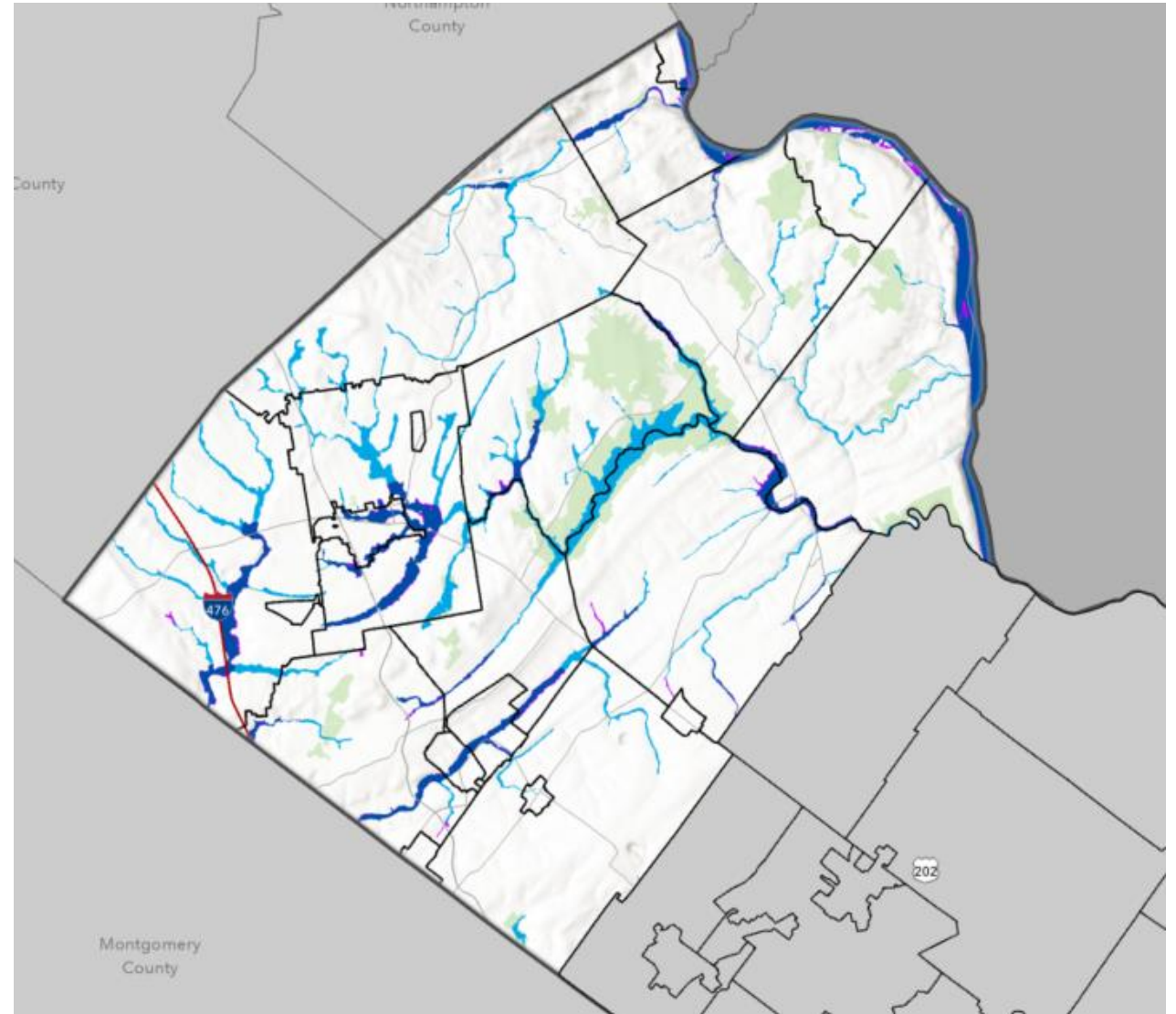
Analysis

Flood Zones – Upper Bucks

- Riverine environments, more sparsely populated, along Delaware River, Lake Nockamixon, Beaver Run, Unami Creek

Impacts of Flooding on Structures in Upper Bucks County	
	% Structures in SFHA
Riegelsville Borough	38.9%
Bridgeton Twp.	27.2%
Tinicum Twp.	13.5%

Impacts of Flooding on Critical Facilities in Upper Bucks County	
	% Critical Facilities in SFHA
Quakertown Borough	18.2%
Richland Twp.	18.2%
Sellersville Borough	16.7%

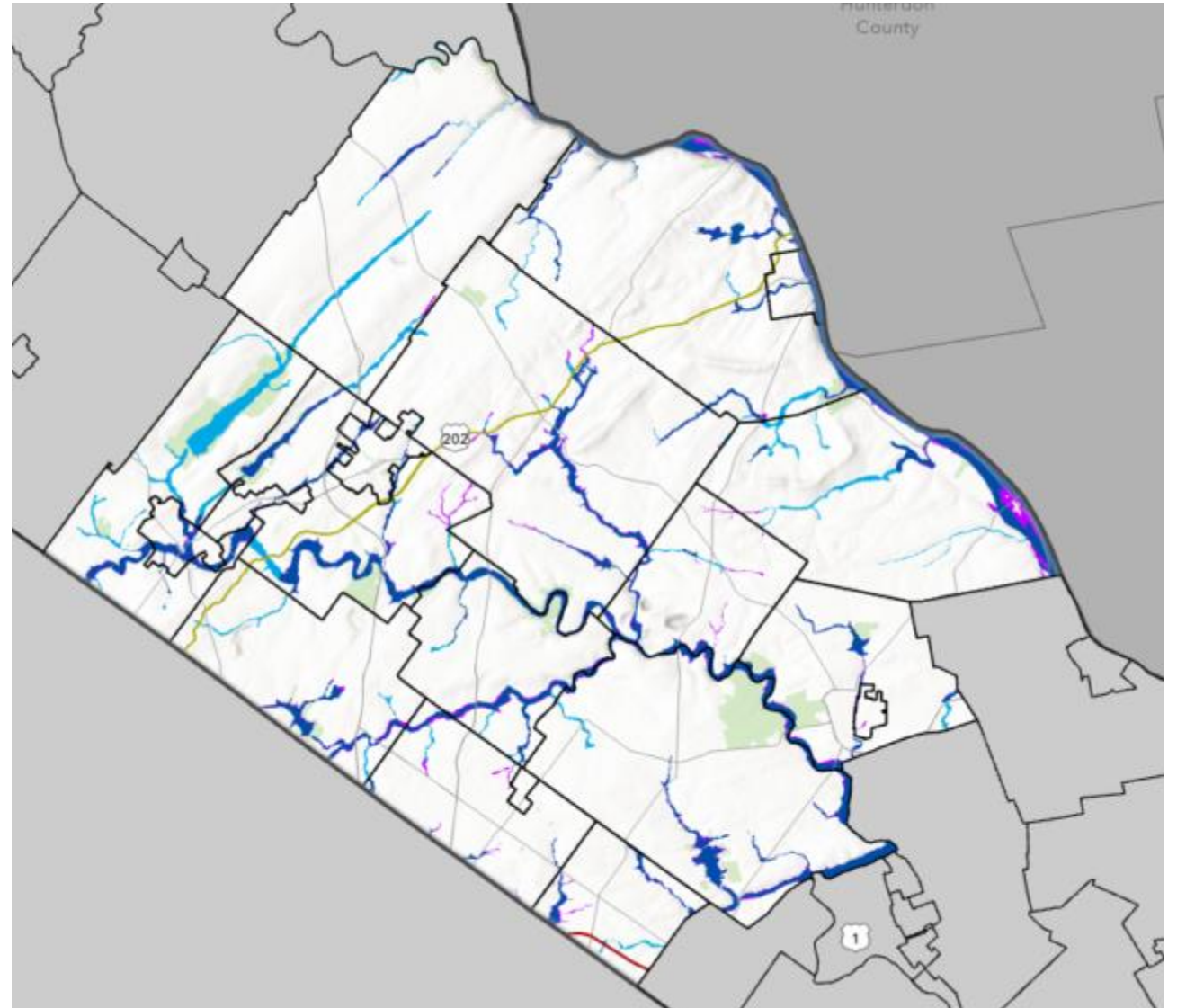


Flood Zones – Central Bucks

- Riverine environments, experiencing development, along Delaware River, Neshaminy Creek, Little Neshaminy Creek

Impacts of Flooding on Structures in Central Bucks County	
	% Structures in SFHA
New Hope Borough	20.5%
Upper Makefield Twp.	6.9%
Chalfont Borough	4.1%

Impacts of Flooding on Critical Facilities in Lower Bucks County	
	% Critical Facilities in SFHA
New Hope Borough	12.5%
Chalfont Borough	12.5%
Upper Makefield Twp.	11.1%

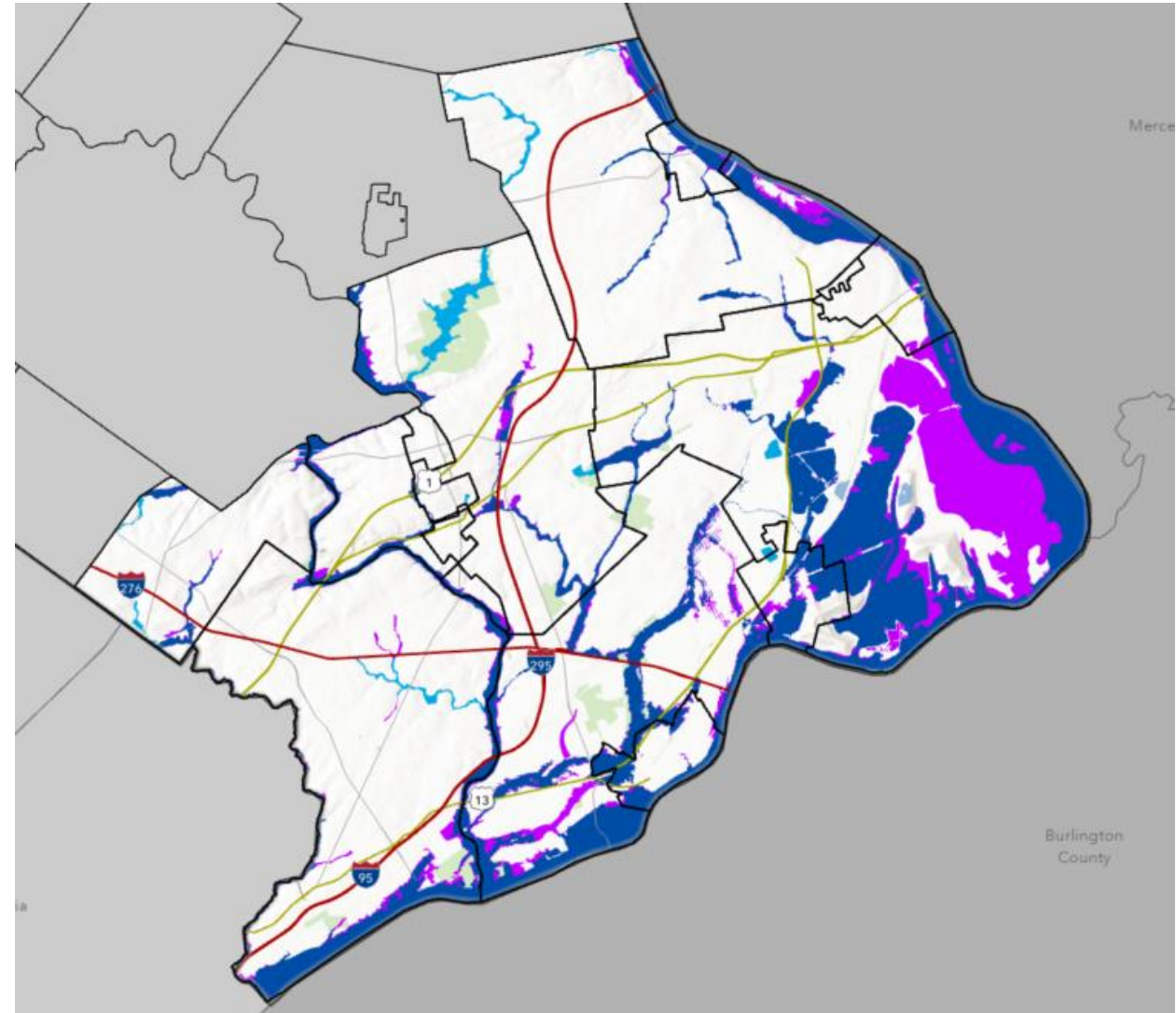


Flood Zones – Lower Bucks

- Low lying formerly industrial land uses along Delaware River, Neshaminy Creek, Pennypack Creek

Impacts of Flooding on Structures in Lower Bucks County	
	% Structures in SFHA
Yardley Borough	27.5%
Hulmeville Borough	12.4%
Bristol Borough	8.1%

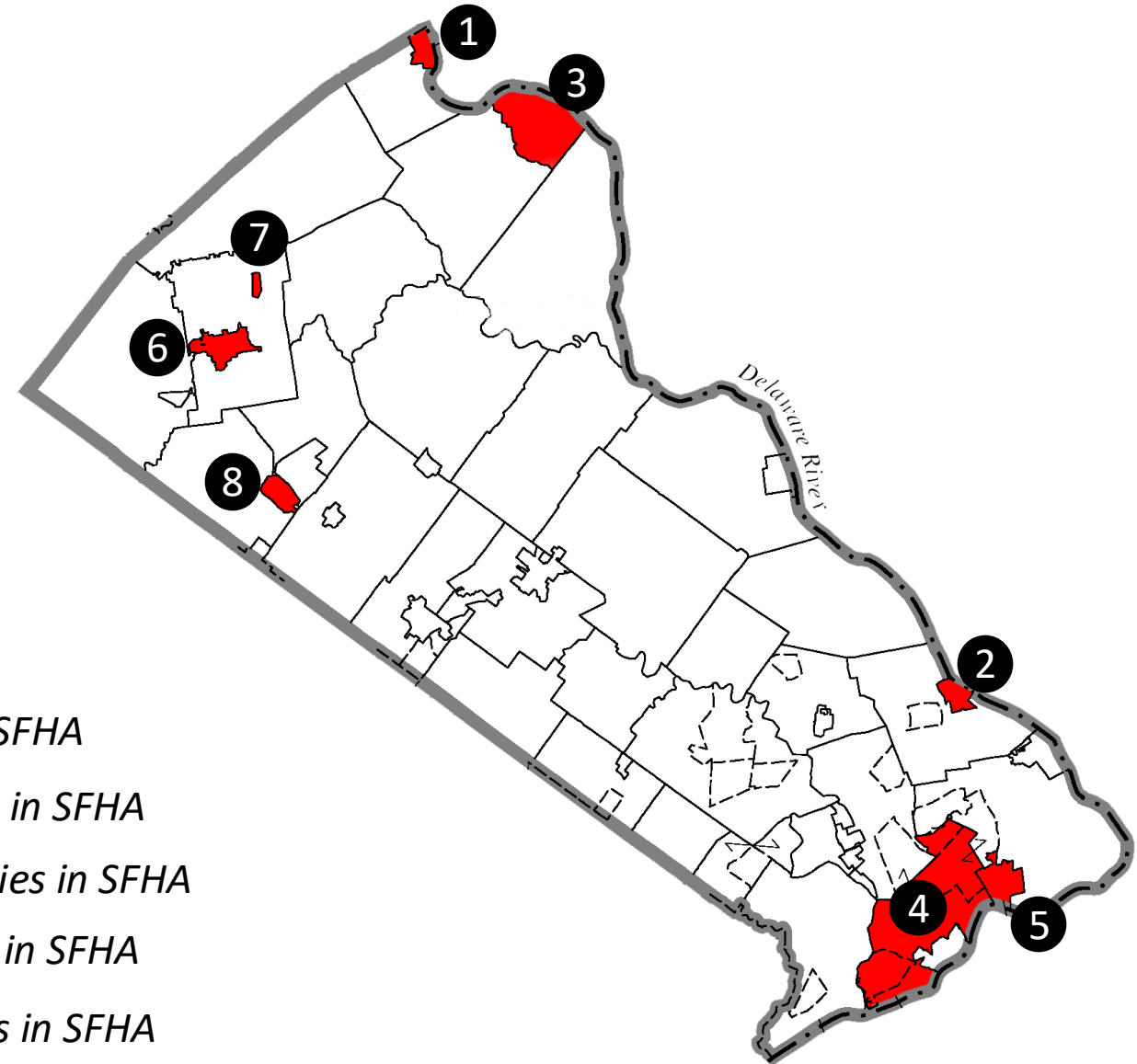
Impacts of Flooding on Critical Facilities in Lower Bucks County	
	% Critical Facilities in SFHA
Bristol Borough	26.3%
Tullytown Borough	25.0%
Lower Makefield Twp.	10.3%



Impacted Critical Facilities – Flood Risk

Bucks County has

- **16%** of identified critical facilities in SFHA
- **7%** of structures in SFHA

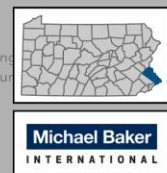
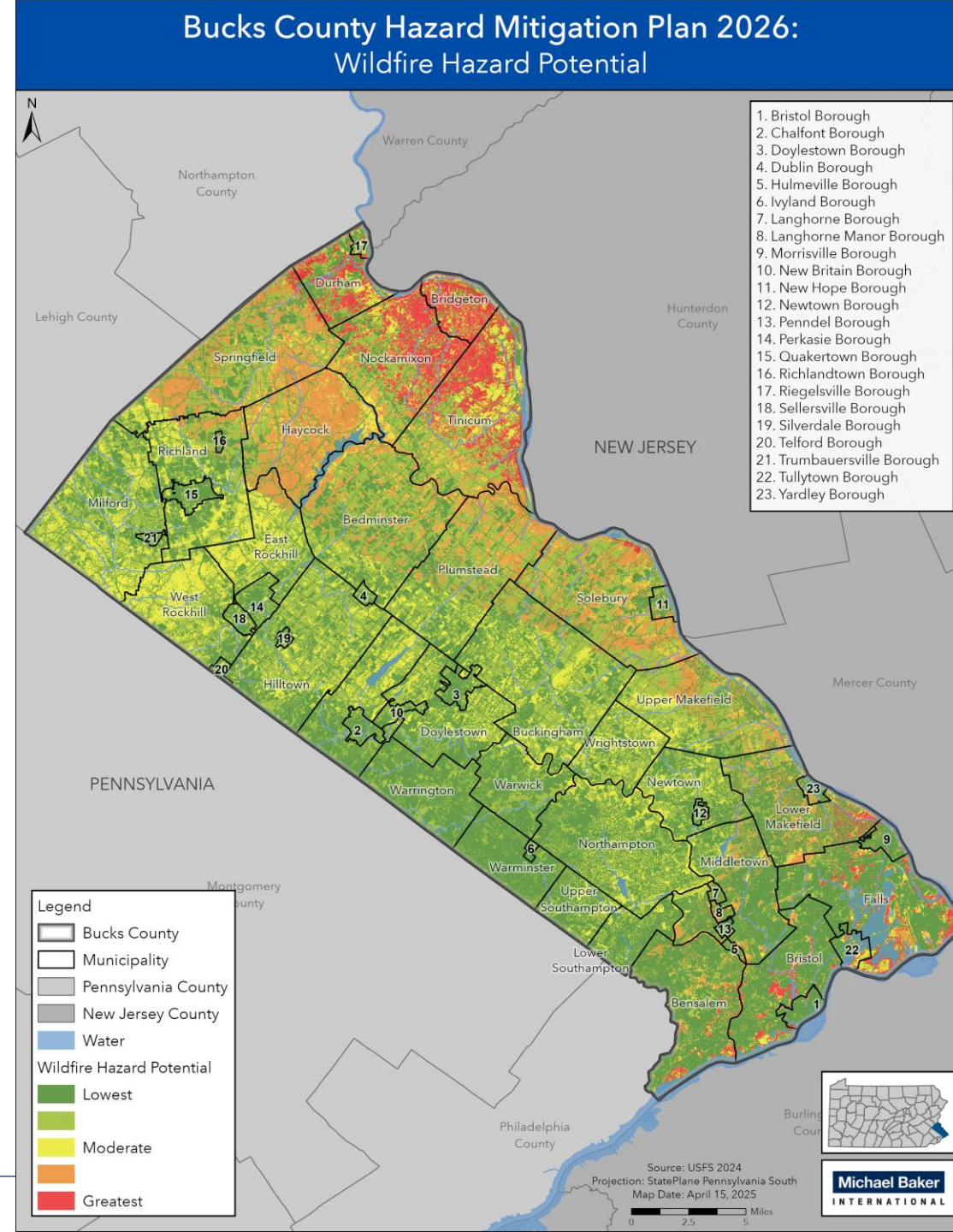


- ➊ *Riegelsville Borough- **39%** of Structures in SFHA*
- ➋ *Yardley Borough- **27%** of Structures in SFHA*
- ➌ *Bridgeton Township- **27%** of Structures in SFHA*
- ➍ *Bristol Borough- **26%** of Identified Critical Facilities in SFHA*
- ➎ *Tullytown Borough- **25%** of Identified Critical Facilities in SFHA*
- ➏ *Quakertown Borough- **18%** of Identified Critical Facilities in SFHA*
- ➐ *Richland Township- **18%** of Identified Critical Facilities in SFHA*
- ➑ *Sellersville Borough- **17%** of Identified Critical Facilities in SFHA*

Wildfire

- **Wildfire** was mentioned as a hazard of concern by 15 municipalities. Storm impacts (particularly a risk from downed trees) was mentioned by 15 municipalities.
- Wildfire may disproportionately impact Upper Bucks municipalities with higher forest cover and less building density. Potential may increase with increased drought occurrence.
- A total of 29.4% of Bucks County is wooded / forest cover. These geographies are primarily in Upper and Central Bucks.

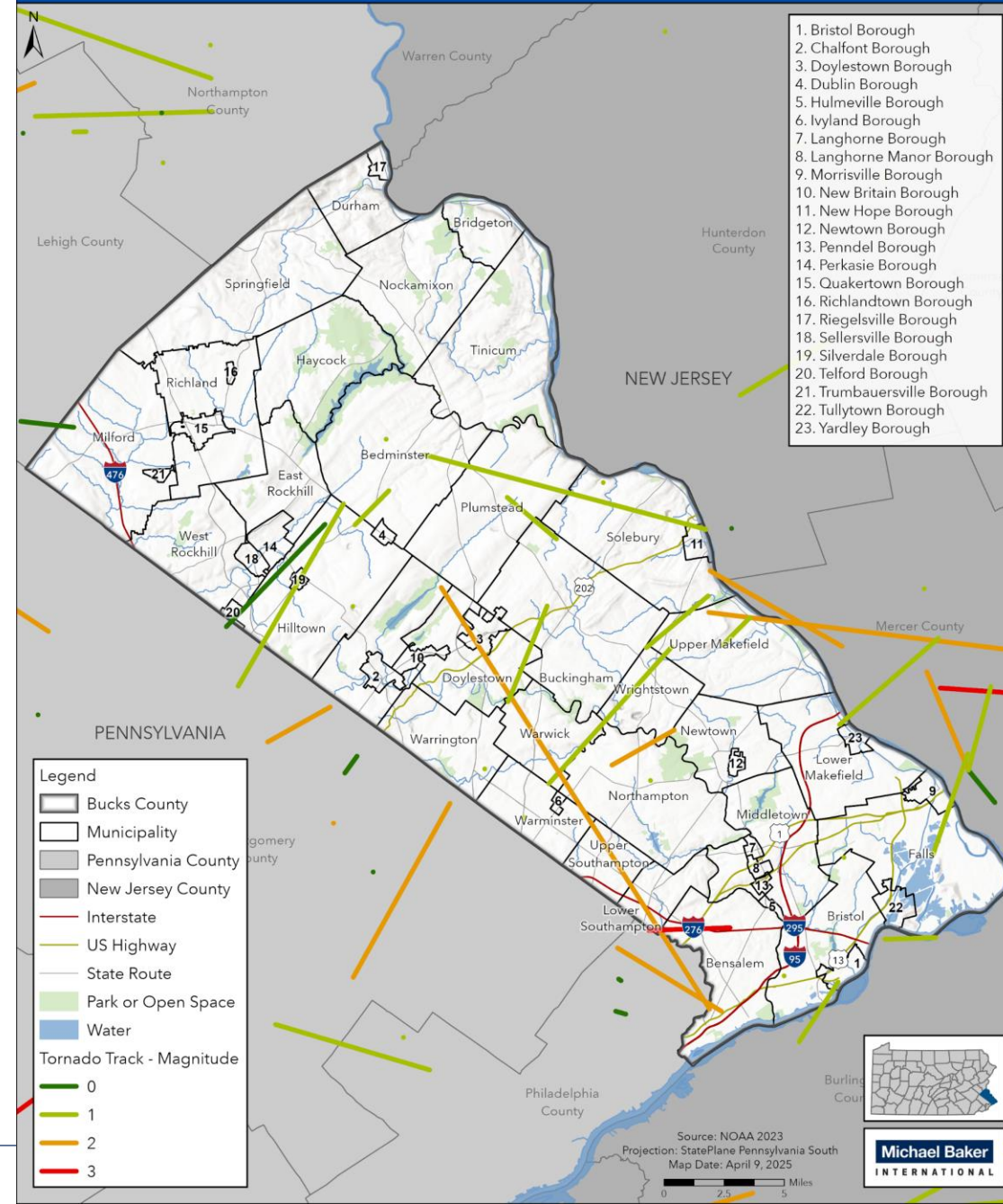
Municipalities with Highest Share of Forest Cover		
	Acres	Share of Area
Haycock Twp.	9,161	67.8%
Bridgeton Twp.	2,859	66.8%
Nockamixon Twp.	7,901	54.9%



Severe Storms

- Severe Storms leading to more frequent downed trees- infrastructure impacts + threat to population and property. Tree management and building stock in wooded areas also a crucial component.
- Populations vulnerable include those reliant on electricity for medical care (highlighted through survey responses), rural residents, renters, and economically vulnerable populations.
- A total of 29.4% of Bucks County is wooded / forest cover. These geographies are primarily in Upper and Central Bucks.

Bucks County Hazard Mitigation Plan 2026: Tornado Tracks

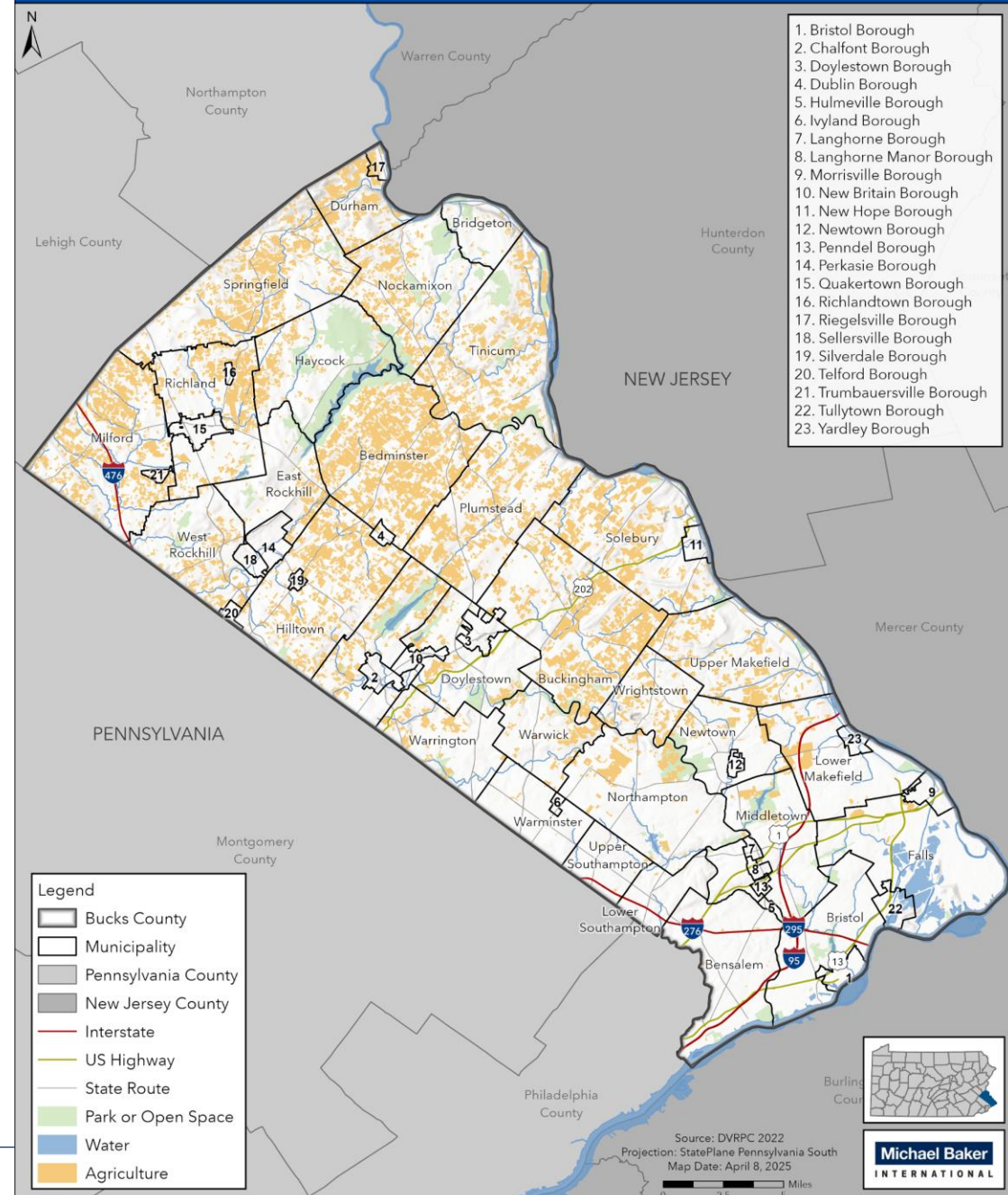


Drought

- Drought was mentioned as a hazard of concern by 15 municipalities.
- **Drought** may disproportionately impact Upper Bucks municipalities with higher agricultural land use and higher dependence on private wells and septic.
- A total of 19.4% of Bucks County is dedicated to agricultural land uses, primarily in Upper and Central Bucks.

Municipalities with Highest Share of Agricultural Land Uses		
	Acres	Share of Area
Bedminster Twp.	10,144	50.7%
Riegelsville Borough	259	37.3%
Durham Twp.	2,166	36.5%

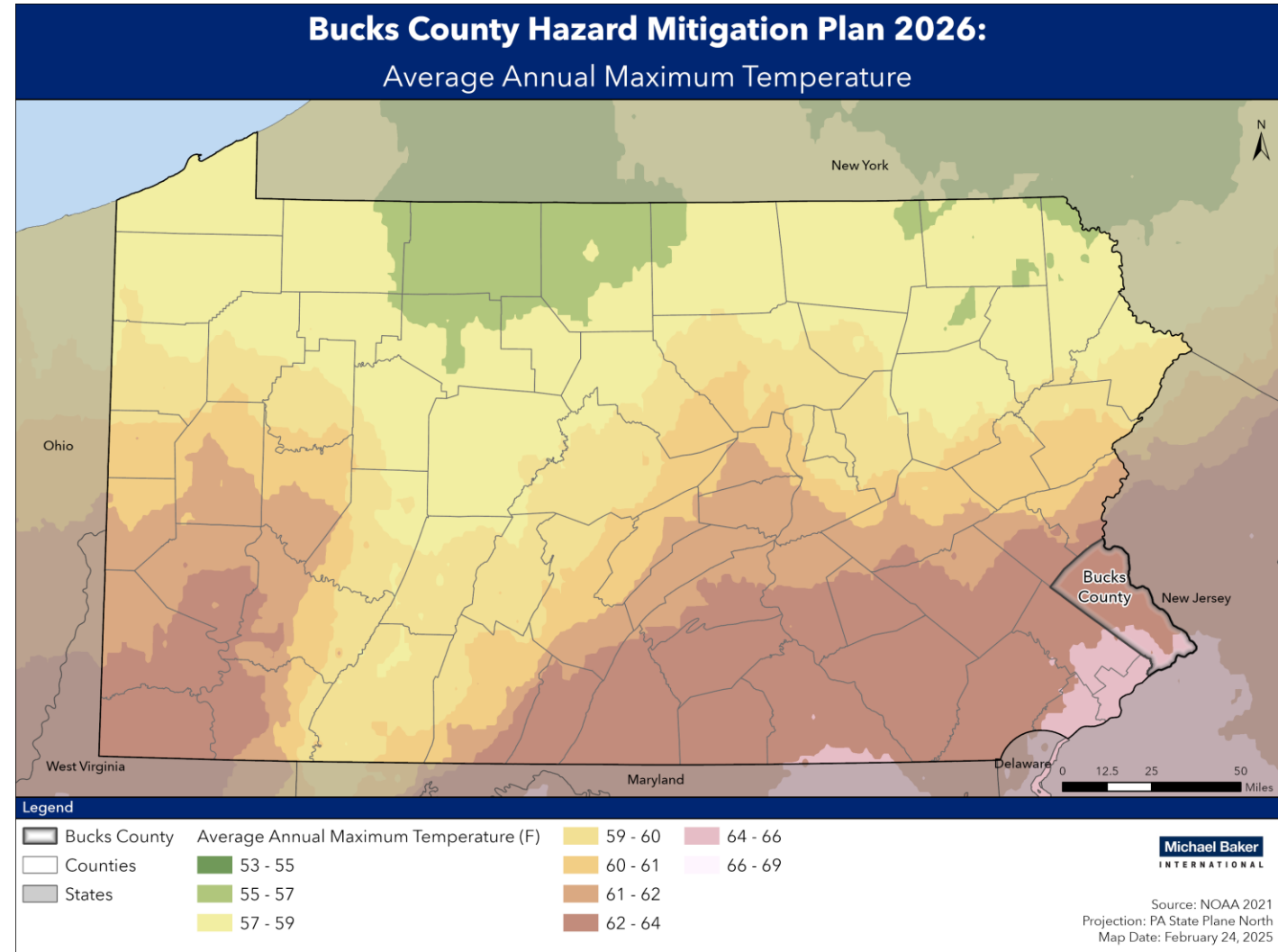
Bucks County Hazard Mitigation Plan 2026: Agriculture Land Use

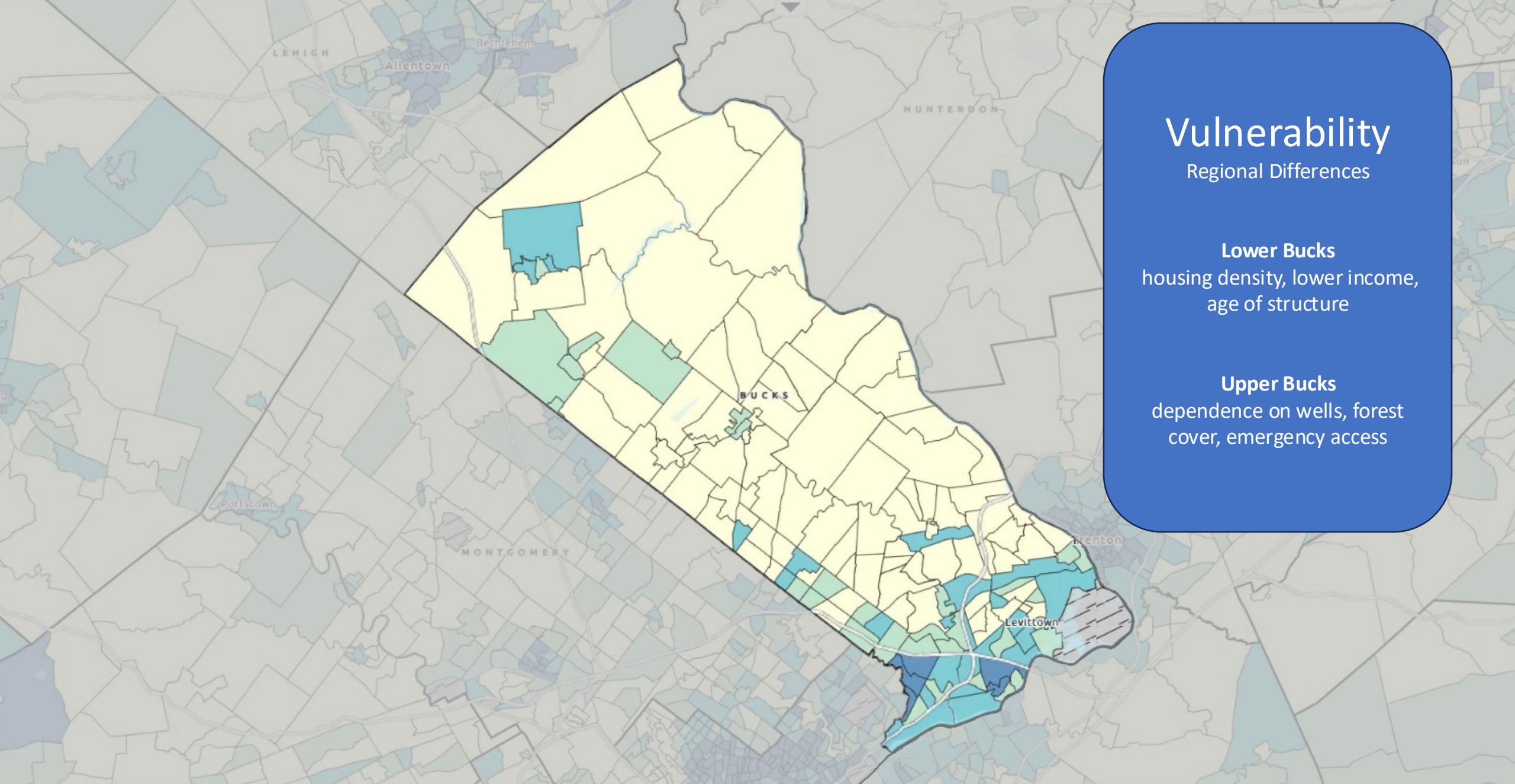


Extreme Heat

- **Extreme heat** may have disproportionate impact on more urbanized areas of Lower Bucks, and may disproportionately impact the elderly, populations with a disability, and lower income populations. Extreme Heat was raised as a hazard of concern by 15 municipalities.
- A total of 31.9% of Bucks County is developed with residential or commercial development– the density of this development can inform risks to extreme heat.
- Lower Bucks experiences a lower average annual maximum temperature, yet the density of development may hold onto heat longer, cascading impacts of extreme temperatures

Municipalities with Highest Share of Residential + Commercial Land Uses	
	Share of Area
Newtown Borough	76.7%
Penndel Borough	69.7%
New Britain Borough	66.3%





Vulnerability

Regional Differences

Lower Bucks
housing density, lower income,
age of structure

Upper Bucks
dependence on wells, forest
cover, emergency access

Level of Vulnerability

LOW

LOW-Medium

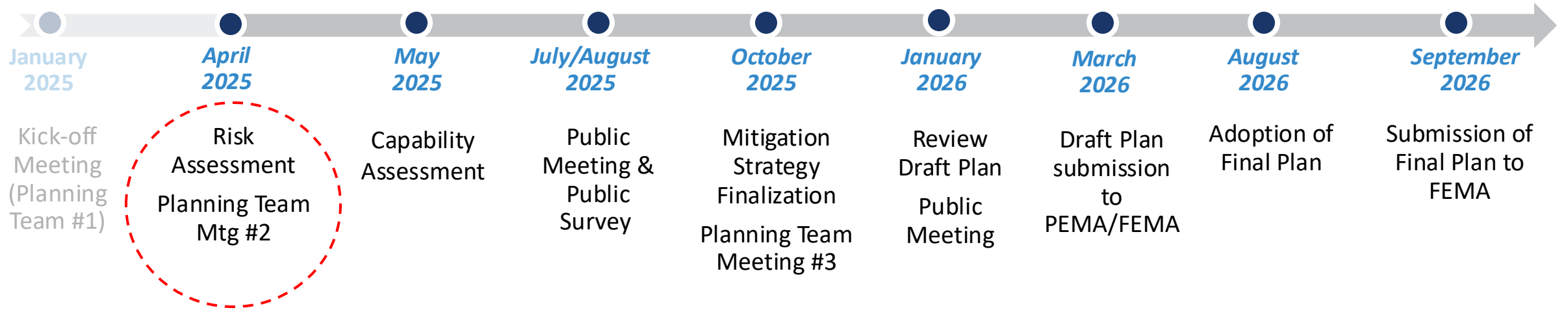
Medium-High

High

No Data

Next Steps

Project Schedule:



Action Items

1. Complete capability worksheets and send via email to taylor.harrington@mbakerintl.com
2. Please send any suggested stakeholder contact information to Jessica.Jahre@mbakerintl.com

Next Steps

Capability Assessment and Mitigation Strategy- Local feedback from capability assessment survey will inform ongoing resilience efforts, discuss and refine priorities, and identify mitigation strategies.

Next Meeting – October, date TBD

Thank You!
