COLLEGE TOWNSHIP WATER AUTHORITY
REGULAR MEETING AGENDA
Wednesday, August 6, 2025
Hybrid Meeting (In-Person, Virtual via Zoom and by Phone)

GENERAL MEETING INFORMATION

College Township now offers in-person and virtual attendance for all public meetings. To attend in person, meetings are at 1481 E. College Avenue, State College, PA, 16801, 2nd-floor meeting room. To attend virtually, please see the information below.

To Attend the LIVE Meeting Via Zoom on a Computer or Smartphone:

https://us02web.zoom.us/meeting/register/_xbQSOJtS0aow3UeWUzijA

After you RSVP, a link to register via Zoom will be shown. Once registered, you will receive a confirmation email containing information about joining the meeting.

To Attend the LIVE Meeting Via Phone:
Dial: 1 646 558 8656 ● **Meeting ID:** 852 2315 3831 ● **Passcode:** 385386

***Detailed instructions for assistance with participating via Zoom are available on the Township website.**

VIRTUAL PARTICIPANTS: Please use the raised hand feature to comment publicly during the meeting. The moderator will recognize those with their hands raised (either by name or phone number).

WRITTEN PUBLIC COMMENTS: For specific agenda items and items not on the agenda, written public comments can be submitted by noon the day of the meeting by emailing: tshaffer@collegetownship.org

Call to Order

Public Comment

Approval of Minutes

1. July 9, 2025 - Regular Meeting Minutes – **Approval**

Operations Update – Staff

1. Monthly Route Billing Analysis
2. Fire Route Monthly Readings
3. Inventory Report
4. New Service Connection

Finance Report – Staff

1. Ratifications of Disbursements – July – **Discussion/Action**
2. Financial Report – June 2025 **– Discussion/Action**

Old Business

New Business

1. 2025 Centre County Hazard Mitigation Plan – **Discussion**

2. R-25-03 – Hazard Mitigation Plan – **Action**

3. 2024 CTWA Audit **- Discussion**

Reports

1. Consulting Engineers Report – Michael Daschbach
2. Solicitor Report – Cristin Long **(Verbal)**
3. Sub-Committee Report – Richard Harris/Don Hartzell (**Verbal)**

Other Matters

Informative

Adjournment

COLLEGE TOWNSHIP WATER AUTHORITY REGULAR MEETING MINUTES
July 9, 2025
1481 E. College Avenue State College PA 16801
Hybrid Meeting (In-Person or via Zoom)

MEMBERS PRESENT:	Donald Hartzell – Chair Michael Grutzeck – Secretary Richard Harris – Treasurer Raymond Liddick, Jr. – Vice-Chair & Assistant Treasurer
STAFF PRESENT:	Amy Kerner - Public Works Director Tanya Shaffer – Assistant Recording Secretary Michael Daschbach – Entech Engineering Adam Brumbaugh – Open Records Officer & Recording Secretary Kim Patishnock – Finance Director Joseph Fedeli – CPA Cristing Long – McQuaide Blasko
ABSENT MEMBERS & STAFF:	None

CALL TO ORDER: Chair Hartzell called the meeting to order at 7:00 p.m.

PUBLIC COMMENT:

Tayaya Coffey from Center Documenters joined via Zoom. Chair Hartzell asked if she had any comments, but she stated she was observing and had no comments to share.

Chair Hartzell noted that, after nine years of effort, the Oak Hall Well has received approval, though some stipulations are expected. A project proposal is anticipated by the end of the year, with bidding scheduled for early January or February 2026. Mr. Daschbach added that the new well could potentially be operational by the end of 2026.

APPROVAL OF MINUTES:

June 7, 2025, CTWA Regular Meeting Minutes

Treasurer Harris moved to approve the June 4, 2025, regular meeting minutes as written
Secretary Grutzeck seconded.
The motion carried unanimously

OPERATIONS UPDATE:

Mr. Brumbaugh provided the following updates:

- **OU-1 – Monthly Route Billing Analysis:** Remains consistent.

- **OU-3 – Inventory Report:** No leaks reported
- **OU-4 – New Service Connections:** Anticipated Growth in New Service Connections in the upcoming months.
- **OU-5 – Temporary/Short Term Electricity Agreement:** Mr. Brumbaugh reported that the College Township Water Authority is a participating member of the Centre Region Solar Power Purchasing Agreement. All required documents have been executed. As the solar generation facility is not yet constructed, a temporary electricity contract is in place. The Authority has secured a favorable short-term rate of 8.003 cents per kilowatt-hour.

FINANCE REPORT – STAFF

FR-1 - Ratification of Disbursements – June 2025

Treasurer Harris moved to ratify the June 2025 disbursements as shown.
Vice-Chair & Assistant Treasurer Liddick seconded.
The Motion carried unanimously.

No financial report was presented at this meeting; however, the Board discussed the need to include one at the next meeting to address previously raised concerns.

OLD BUSINESS:

No items were introduced.

NEW BUSINESS:

No items were introduced.

REPORTS:

R-1 Consulting Engineer Report

Mr. Daschbach reported that the Oak Hall Well has received approval. He also noted that the First Avenue waterline project has been completed and is now in service, with all connections made. Storm drain issues that arose during the project have been resolved. Paving will be handled under a separate contract by the Township.

R-2 Solicitor Report

Ms. Long reported that there has been no response from Walmart representatives, and the Board will need to follow up on the matter. She also noted that an update on the CRPRA lease amendment is expected by the next meeting, and protocols for wellhead protection are currently being developed.

R-3 Sub-Committee Report

Treasurer Harris reported that the Engineering Committee met earlier today to review projects in preparation for the upcoming budget, with a focus on system maintenance priorities. She noted there are outstanding expenses related to the Rogers and Spring Creek wells that still need to be addressed.

Chair Hartzell added that a midterm review of the Capital Improvement Plan was conducted, highlighting the need for updated cost assessments.

OTHER MATTERS:

No items were introduced.

INFORMATIVE:

No items were introduced.

ADJOURNMENT:

Chair Hartzell called for a motion to adjourn the meeting.

Treasurer Harris moved to adjourn the July 9, 2025, CTWA Regular meeting. The meeting was adjourned at 7:22 p.m.

Respectfully submitted,

*******Draft*******

Adam Brumbaugh, Open Records Officer & Recording Secretary

OU-1

MONTHLY ROUTE BILLING ANALYSIS

MONTH: July 2025

	ROUTE #'S BILLED THIS MONTH					
DATES	1010	1004	1008	1006	1015	Beneficial Reuse
Meter Read	06/19/25	06/26/25	06/30/25	07/08/25	07/14/25	7/15/2025
Billed	07/20/25	07/20/25	07/20/25	07/20/25	07/20/25	7/20/2025
Due	08/19/25	08/19/25	08/19/25	08/19/25	08/19/25	8/19/2025
# OF ACCOUNTS BILLED						
This Quarter	164	126	132	217	141	3
Previous Quarter	162	128	133	218	141	3
Prior Year Same Quarter	163	125	134	218	141	3
CUSTOMER USAGE						
April / May / June 2025 (approximate)	1,990,000	6,275,000	1,308,000	2,030,000	1,678,000	3,379,000
Jan / Feb / Mar 2025 (approximate)	1,894,000	5,525,000	1,214,000	1,864,000	1,405,000	3,363,000
Prior Year Same Quarter (approximate)	1,860,000	5,948,000	1,343,000	2,454,000	2,051,000	2,926,000
$$$ BILLED						
This Quarter	$ 15,920	$ 50,200	$ 10,464	$ 16,240	$ 13,424	$ 19,359
Previous Quarter	$ 15,152	$ 44,200	$ 9,712	$ 14,912	$ 11,240	$ 18,961
Prior Year Same Quarter (approximate)	$ 14,359	$ 45,919	$ 10,368	$ 18,945	$ 15,834	$ 15,400
ROUTE'S NET PAST DUE (CREDIT)	$ (88)	$ (83)	$ (504)	$ (1,159)	$ 2,450	$0

Current Month's Billing Notes:

FIRE ROUTE MONTHLY READINGS
2025

NAME	18-Dec	16-Jan	14-Feb	14-Mar	15-Apr	15-May	13-Jun	15-Jul	16-Aug	18-Sep	16-Oct	15-Nov	18-Dec
TAILGATE	0000K-JK	0000K-CC	0000K-CC	0000K-ER	0000K-JK	0000K-CC	0000K-CC	0000K-EM					
WASHINGTON ASSOC- 366 Walker Dr	0011K-JK	0011K-CC	0011K-CC	0011K-ER	0011K-JK	0011K-CC	0011K-CC	0011K-EM					
NITTANY COMMONS - GET AIR	0006K-JK	0006K-CC	0006K-CC	0006K-ER	0006K-JK	0006K-CC	0006K-CC	0006K-EM					
HORIZON FEDERAL CREDIT UNION	0000K-JK	0000K-CC	0000K-CC	0000K-ER	0000K-JK	0000K-CC	0000K-CC	0000K-EM					
BARNES & NOBLE	0000K-JK	0000K-CC	0000K-CC	0000K-ER	0000K-JK	0000K-CC	0000K-CC	0000K-EM					
WALMART/SAMS CLUB	0006K-JK	0006K-CC	0006K-CC	0006K-ER	0006K-JK	0006K-CC	0006K-CC	0006K-EM					
STEVE SHANNON TIRE	0079K-JK	0079K-CC	0080K-CC	0080K-ER	0080K-JK	0080K-CC	0080K-CC	0080K-EM					
NITTANY CENTRE - SEARS (PIT)	0955911G-JK	0956045G-CC	0956197G-CC	0956338G-ER	0958030G-JK	0959618G-CC	0960190G-CC	0960861G-EM					
NITTANY CENTRE - MACY'S	0329588G-JK	0329936G-CC	0330300G-CC	0330653G-ER	0331890G-JK	0333696G-CC	0333974G-CC	0334596G-EM					
WEST PENN POWER	0001K-JK	0001K-CC	0001K-CC	0001K-ER	0001K-JK	0001K-CC	0001K-CC	0001K-EM					

****As per Jere. The primary fire service valve servicing Gabe's from the fire line did not fully close/seat and a small amount of water continued to bleed through.**
The system was set such that any water pushing through the unseated valve was then released outdoors in the space between the Gabes loading dock and the hallway adjacent to the Dance Academy.

***Meter read by: (JK)=John (ER)=Ed (EM)=Eddie (DS)=Dale (JB)=Josh Blair (CC)=Caleb Colley
**Fire service to the Rutgers Plant has been discontinued. Turned off 5/23/05.
***Sears and Macy meters changed out 6/23/11. New reading Macy's 0 and Sears 0.

Mall Fire Line Usage:	Gallons:							
Sears Pit Usage:	407	134	152	141	1,692	1,588	671	
Macy's Pit Usage:	650	348	364	353	1,237	1,806	622	
Total:	1,057	482	516	494	2,929	3,394	1,293	

OU-2

New Service Connections

	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
January	0	1	2	1	2	1	2	1	0	0	0
February	1	1	4	2	2	1	2	1	3	1	0
March	0	3	1	1	4	1	1	3	4	1	3
April	2	2	4	4	1	0	3	0	2	2	0
May	3	1	1	2	0	1	6	0	1	0	0
June	1	0	1	2	1	0	2	1	1	4	1
July	4	1	3	2	1	4	0	1	1	0	
August	3	1	3	4	1	1	4	3	3	1	
September	2	6	1	1	3	0	0	2	0	1	
October	1	2	3	3	0	2	2	1	0	1	
November	1	1	1	0	2	2	2	0	1	1	
December	0	0	0	0	1	2	0	0	1	1	
Total:	18	19	24	22	18	15	24	13	17	13	4

College Township Water Authority

Disbursements
For Ratification

July 2025

College Township Water Authority
Disbursements Summary

July 2025

Checks Issued	$	672,112	Listing Attached
Payrolls - 7/11 & 7/25		33,009	Payroll / Taxes
Transferred to PLGIT Designated Funds Acccounts		-	
TOTAL DISBURSEMENTS	$	705,122	

Report Criteria:
Detail report type printed
Invoice Detail.GL account = "95100000"-"95497895"

Vendor Number	Name	Invoice Number	Description	Seq	Invoice Date	Invoice Amount	Discount Amount	Check Amount	Check Number	Check Issue Date
4	Ace Hardware	111697/1	Shop Vac Filter	1	07/01/2025	10.81	.00	10.81	13165	07/02/2025
26	Ameron Construction, Inc.	6522	Topsoil	1	07/01/2025	690.00	.00	690.00	13173	07/10/2025
64	Best Line Equipment	P27276	Stock Parts	1	07/01/2025	143.97	.00	143.97	13174	07/10/2025
1163	Black Bear Fiber	AUGUST 202	Internet Service - August 2	3	07/15/2025	108.00	.00	108.00	13202	07/24/2025
118	Centre Concrete Company,	260479	1st Ave Thrust Block	1	07/01/2025	141.75	.00	141.75	13203	07/24/2025
143	Cintas Corporation #536	11590116 - J	Uniforms - CTWA	3	07/01/2025	87.15	.00	87.15	13204	07/24/2025
164	College Township General	7/1/25	2013 Ford F-150	1	07/01/2025	7,501.00	.00	7,501.00	13175	07/10/2025
		7440	GIS	7	07/01/2025	2,262.00	.00	2,262.00	13205	07/24/2025
		7440	Mgmt	1	07/01/2025	10,392.00	.00	10,392.00	13205	07/24/2025
		7440	Postage	2	07/01/2025	2,207.48	.00	2,207.48	13205	07/24/2025
		7440	Equip. Rental	3	07/01/2025	2,100.00	.00	2,100.00	13205	07/24/2025
		7440	Eng Srvc	4	07/01/2025	2,142.00	.00	2,142.00	13205	07/24/2025
		7440	First Ave	5	07/01/2025	578.00	.00	578.00	13205	07/24/2025
		7440	OH-20	6	07/01/2025	204.00	.00	204.00	13205	07/24/2025
174	Comcast Business	89931134700	Rogers Well Monitoring	1	07/15/2025	71.95	.00	71.95	13215	07/31/2025
196	Construction Tool Service, I	7147417-01	Safety	1	07/11/2025	45.08	.00	45.08	13216	07/31/2025
		7147417-01	Leak Repair	2	07/11/2025	183.00	.00	183.00	13216	07/31/2025
306	Cooper Electric	S058910550.	Tools	1	07/01/2025	27.77	.00	27.77	13186	07/17/2025
		S058911245.	Cord Connector	1	07/01/2025	6.89	.00	6.89	13186	07/17/2025
245	Dale Smith Jr	7/16/25	Internet Reimbusement - Q	1	07/01/2025	186.99	.00	186.99	13187	07/17/2025
253	Eby Paving & Construction	15750.1	Oakmont	1	07/01/2025	127.20	.00	127.20	13176	07/10/2025
		15750.1	Squirrel Drive	2	07/01/2025	151.76	.00	151.76	13176	07/10/2025
725	Edward Ranio	7/16/25	Internet Reimbusement - Q	1	07/01/2025	205.77	.00	205.77	13188	07/17/2025
265	Entech Engineering, Inc	0096816	OH-20 Well Fac & Booster	1	07/01/2025	4,923.75	.00	4,923.75	13166	07/02/2025
		0096817	First Ave Waterline Replac	1	07/01/2025	1,888.75	.00	1,888.75	13166	07/02/2025
		0096818	Engineering Services - Ma	1	07/01/2025	4,940.00	.00	4,940.00	13166	07/02/2025
372	Glenn O. Hawbaker, Inc.	872794	Oakmont	2	07/01/2025	1,224.80	.00	1,224.80	13167	07/02/2025
352	Hach Company	14520895	Spring & Rogers Reagent	1	07/01/2025	381.45	.00	381.45	13189	07/17/2025
		14557294	Maintenance Service	1	07/01/2025	2,008.26	.00	2,008.26	13189	07/17/2025
		2236455	Service Credit	1	07/01/2025	1,596.00-	.00	1,596.00-	13189	07/17/2025
1311	Haizhou Wang	7/16/2025	Account #312530031 Over	1	07/11/2025	56.00	.00	56.00	13190	07/17/2025
453	John Keslar	7/15/25	Internet Reimbusement - Q	1	07/01/2025	212.34	.00	212.34	13191	07/17/2025
		7/16/25	Cell Phone Reimbursemen	1	07/01/2025	82.50	.00	82.50	13191	07/17/2025
1026	Joshua Blair	7/16/25	Internet Reimbusement - Q	1	07/01/2025	105.00	.00	105.00	13192	07/17/2025
488	Lawco, Inc.	25067769	Ultrasonic Flowmeter Certif	1	07/01/2025	825.00	.00	825.00	13177	07/10/2025
489	LB Water Service, Inc.	3935526	Oak Hall Flashing Station	1	07/01/2025	178.75	.00	178.75	13168	07/02/2025
		3935529	Stock	1	07/01/2025	438.74	.00	438.74	13168	07/02/2025
		3935530	Stock Joints	1	07/01/2025	620.00	.00	620.00	13168	07/02/2025
		3935531	Stations	1	07/01/2025	175.00	.00	175.00	13168	07/02/2025
		3937176	Stock Fire Hydrant Parts	1	07/01/2025	45.71	.00	45.71	13168	07/02/2025
		3941784	Stock Fittings	1	07/01/2025	573.21	.00	573.21	13193	07/17/2025
		3942728	Spring Creek Station Bushi	1	07/01/2025	6.50	.00	6.50	13207	07/24/2025
156	Lyn Lee Farms LLC	1014	Waste Fill - May 2025	1	07/01/2025	150.00	.00	150.00	13178	07/10/2025
		1035	Waste Fill	1	07/07/2025	75.00	.00	75.00	13217	07/31/2025
542	Mid-State Paving, LLC	6/27/25	First Ave Waterline Replac	1	07/01/2025	577,476.22	.00	577,476.22	13194	07/17/2025
407	Mission Square-108864/40	7/11/25	CTWA Contribution-PR#14	2	07/10/2025	1,015.38	.00	1,015.38	13180	07/10/2025
		7/25/2025	CTWA Contribution-PR#15	1	07/23/2025	1,015.38	.00	1,015.38	13208	07/24/2025
579	National Insurance Service	1707601	Insurance Premium-August	3	07/18/2025	396.54	.00	396.54	13209	07/24/2025
1080	Orchard Pump & Supply C	AX007843	OH-19 - Air Tank	1	06/03/2025	1,299.12	.00	.00	13156	Multiple
		AX007843	OH-19 - Air Tank	2	06/03/2025	1,299.12-				
		SC208759	Air Tank	1	06/04/2025	1,299.12	.00	1,299.12	Multiple	Multiple
682	PA Municipal Health Insura	222042-0	Insurance Premium-CTWA	2	07/08/2025	22,564.87	.00	22,564.87	13210	07/24/2025
638	PA One Call System, Inc.	0001110374	Monthly Service - June 202	1	07/01/2025	110.01	.00	110.01	13211	07/24/2025

Vendor Number	Name	Invoice Number	Description	Seq	Invoice Date	Invoice Amount	Discount Amount	Check Amount	Check Number	Check Issue Date
665	Penstan Supply/Hajoca Co	S035878458.	Dry Wipes	1	07/01/2025	36.36	.00	36.36	13169	07/02/2025
		S035884202.	Oak Hall park	1	07/01/2025	59.44	.00	59.44	13169	07/02/2025
		S035910826.	PVC	1	07/01/2025	18.93	.00	18.93	13169	07/02/2025
		S035910826.	PVC	1	07/01/2025	19.90	.00	19.90	13169	07/02/2025
		S036089713.	Brass Union	1	07/07/2025	110.96	.00	110.96	13219	07/31/2025
670	Petty Cash-1	7/30/2025	Postage - Water	2	07/30/2025	7.20	.00	7.20	13220	07/31/2025
		7/30/2025	CTWA Shortage	3	07/30/2025	20.00	.00	20.00	13220	07/31/2025
		7/30/2025	Petty Cash Overage	4	07/30/2025	1.00-	.00	1.00-	13220	07/31/2025
		7/30/2025	Water - OH Well	5	07/30/2025	6.85	.00	6.85	13220	07/31/2025
1186	Quality Hydraulics, LLC	22295	Fire Hydrant	1	07/01/2025	28.92	.00	28.92	13181	07/10/2025
		22432	Hydrant Wrench	1	07/01/2025	57.32	.00	57.32	13197	07/17/2025
849	Susquehanna Fire Protecti	12492314	Bump Gas W/ Connections	1	07/01/2025	165.00	.00	165.00	13182	07/10/2025
879	Tri-Star, Inc.	1877	Spring Creek Service	1	07/08/2025	2,254.16	.00	2,254.16	13222	07/31/2025
		1877	Rogers Well Service	2	07/08/2025	1,381.04	.00	1,381.04	13222	07/31/2025
		1877	Lemont Service	3	07/08/2025	441.67	.00	441.67	13222	07/31/2025
907	Verizon Wireless	6034968730	Cell Phone Service-Brumb	2	07/15/2025	39.53	.00	39.53	13223	07/31/2025
912	Vision Benefits of America	1900702	CTWA Insurance Premium-	2	07/01/2025	66.35	.00	66.35	13171	07/02/2025
923	West Penn Power/First En	1000912049	Dale St	1	07/10/2025	19.33	.00	19.33	13200	07/17/2025
		1001033906	Oak Hall Park	1	07/01/2025	62.20	.00	62.20	13172	07/02/2025
		1001033916	Oak Hall Park	1	07/24/2025	82.68	.00	82.68	13224	07/31/2025
		20000115868	1675 Trout - Rogers	1	07/21/2025	4,374.56	.00	4,374.56	13225	07/31/2025
		20000115868	323 Balmoral - SCP	2	07/21/2025	1,509.05	.00	1,509.05	13225	07/31/2025
		20000115868	101 Orchard	3	07/21/2025	13.13	.00	13.13	13225	07/31/2025
		20000115868	1675 Trout - Rogers	1	07/01/2025	2,654.06	.00	2,654.06	13172	07/02/2025
		20000115868	323 Balmoral - SCP	2	07/01/2025	1,609.43	.00	1,609.43	13172	07/02/2025
		20000115868	101 Orchard	3	07/01/2025	14.03	.00	14.03	13172	07/02/2025
		20000115906	2008 E Branch	1	07/01/2025	216.25	.00	216.25	13185	07/10/2025
		20000115906	538 Matilda	2	07/01/2025	130.58	.00	130.58	13185	07/10/2025
		20000115906	591 Struble	3	07/01/2025	20.49	.00	20.49	13185	07/10/2025
		20000115906	Late Fee	4	07/01/2025	14.45	.00	14.45	13185	07/10/2025
1153	Wex Bank	105739310	Fuel-CTWA - July 2025	2	07/01/2025	740.23	.00	740.23	13201	07/17/2025
942	Your Building Centers	SC1021 - JU	Concrete Mix	1	07/01/2025	20.25	.00	20.25	13214	07/24/2025
1168	Quill LLC	44712578	Water Supplies	3	07/01/2025	95.49	.00	95.49	13213	07/24/2025
906	Verizon	1548158350	SCADA Modem	2	07/01/2025	58.01	.00	58.01	13184	07/10/2025
		2502975900	Lemont Booster Station	1	07/01/2025	35.47	.00	35.47	13199	07/17/2025
808	Snap-On Tools-Mark Hess	0626251370	Impact Socket	1	07/01/2025	27.25	.00	27.25	13198	07/17/2025
504	L. W. Hose Repair	20484	2012 Chevy Express H150	1	07/02/2025	60.14	.00	60.14	13206	07/24/2025
194	Stuckey Automotive	12887	Heater Hose	1	07/07/2025	201.20	.00	201.20	13221	07/31/2025
891	Univar USA, Inc.	53092318	Aqua Mag/Chlorine- Roger	1	07/01/2025	1,233.75	.00	1,233.75	13183	07/10/2025
1130	Pace Analytical Services, L	2549F4245	Water Testing	1	07/01/2025	535.50	.00	535.50	13196	07/17/2025
		2549F4897	Water Testing	1	07/01/2025	263.70	.00	263.70	13196	07/17/2025
		2549G0456	Water Testing	1	07/01/2025	1,100.00	.00	1,100.00	13212	07/24/2025
		2549G0622	Water Testing	1	07/02/2025	61.70	.00	61.70	13212	07/24/2025
		2549G0627	Water Testing	1	07/02/2025	91.20	.00	91.20	13212	07/24/2025
		2549G1266	Water Testing	1	07/03/2025	103.40	.00	103.40	13212	07/24/2025
		2549G2193	Water Testing	1	07/10/2025	132.90	.00	132.90	13218	07/31/2025
1238	Suburban Testing Labs, Inc	5B03791	Water Testing - PFAS	1	07/01/2025	1,035.00	.00	1,035.00	13170	07/02/2025
532	McQuaide Blasko, Inc.	215460	Solicitor Services- May 202	1	07/01/2025	117.50	.00	117.50	13179	07/10/2025
Grand Totals:						672,112.41	.00	672,112.41		

College Township Water Authority

Finance Update

(Unaudited)

Year to Date: June 30, 2025

Available Funds and Outstanding Debt

College Township Water Authority
Cash and Investments / Outstanding Debt

		Jun-25
Cash / PLGIT Balance	$	344,627
Reserved for Debt Service (prorata)	$	-
Reserved for Operating Costs	$	150,000
Available for Capital, Contingencies, Reserve	$	194,627
	$	344,627
Debt Outstanding (2015 Note - CNB Bank)		
Original Amount	$	10,000,000
Principal Refinanced	$	(1,968,600)
Principal Paid to Date	$	(4,022,500)
Current Balance	$	4,008,900
Debt Outstanding (2022 Note - Jersey Shore State Bank) *		
Refinanced portion of 2015 GO Note	$	1,968,600
Amount drawn down to date	$	730,402
Principal Paid to Date	$	-
Current Balance	$	2,699,002
* Amount Available to Drawdown by 12/06/2025:	$	2,560,498

Operating Revenues and Expenses

Summary Statement

COLLEGE TOWNSHIP WATER AUTHORITY
Summary of Revenues and Expenses

OPERATING YEAR TO DATE VS BUDGET SUMMARY

As of June 30, 2025

	2025 Year to Date	2025 Budget	YTD % of Budget	Prorata Year to Date Percent of Year Elapsed	Prorata Year to Date YTD Over (Under) Elapsed
OPERATING INCOME					
Water System Revenues	962,017	2,075,443	**46%**	**50%**	(75,705)
OPERATING EXPENSES					
Purification and Pumping	70,971	168,848	**42%**	**50%**	(13,453)
Distribution System	270,987	452,975	**60%**	**50%**	44,499
General Expense	356,826	714,136	**50%**	**50%**	(242)
TOTAL OPERATING EXPENSES	698,784	1,335,959	**52%**	**50%**	30,804
OPERATING MARGIN	263,233	739,484	**36%**	**50%**	(106,509)
NON-OPERATING INCOME (EXPENSE)	3,135	24,000	**13%**	**50%**	(8,865)
INCOME BEFORE DEBT SERVICE	**266,368**	**763,484**	**35%**	**50%**	(115,374)
LESS: Debt Service Requirement		638,263			
LESS: Debt Service Paid	77,739				
AVAILABLE FOR CAPITAL, CONTINGENCIES AND RESERVE	**188,629**	**125,221**			

OPERATING INCOME
Line Item Detail

Water System Revenues

	2025 Year to Date	2025 Budget	YTD % of Budget
WATER SYSTEM REVENUES			
METERED WATER REVENUES			
350.110 Metered Water Revenues - Residential	511,244	1,113,600	46%
350.120 Metered Water Revenues - Commercial	190,495	368,800	52%
350.130 Metered Water Revenues - Industrial	21,000	81,600	26%
350.140 Metered Water Revenues - Other Public	9,152	40,000	23%
350.142 Metered Water Revenues - UAJA BRW	37,198	74,707	50%
Subtotal	**769,089**	**1,678,707**	46%
FIRE SERVICES			
360.405 Fire Services - CTWA Hydrants	56,889	113,778	50%
360.410 Fire Services - Private Hydrants	3,875	7,380	53%
360.420 Fire Services - Sprinkler Fire Lines	107,897	207,578	52%
Subtotal	**168,661**	**328,736**	51%
OTHER WATER RELATED REVENUES			
370.300 Penalties	11,420	17,000	67%
370.500 Water Main Connection Fees	6,879	45,000	15%
370.515 Meter Depreciation Charge	707	0	0%
370.000 Miscellaneous	5,261	6,000	88%
Subtotal	**24,267**	**68,000**	36%
TOTAL WATER SYSTEM REVENUES	**962,017**	**2,075,443**	46%

PURIFICATION AND PUMPING EXPENSES
Line Item Detail

Purification and Pumping Expenses

	2025 Year to Date	2025 Budget	YTD % of Budget
PURIFICATION EXPENSE			
405.202 Chemical Purchases	12,154	33,000	37%
405.204 Water Analysis	7,803	22,000	35%
405.206 Structure Maintenance - Mt Nittany Contact Tank	0	0	0%
TOTAL PURIFICATION	**19,957**	**55,000**	36%
PUMPING EXPENSE			
PUDDINTOWN STATION			
410.311 Operating Supplies and Expense	0	0	0%
410.312 Power Purchased	72	140	51%
410.313 Equipment Maintenance	0	0	0%
410.314 Structure Maintenance	0	0	0%
Subtotal	**72**	**140**	51%
MATILDA BOOSTER STATION			
415.321 Operating Supplies and Expense	0	30	0%
415.322 Power Purchased	1,404	3,300	43%
415.323 Equipment Maintenance	0	5,000	0%
415.324 Structure Maintenance	0	0	0%
Subtotal	**1,404**	**8,330**	17%

PURIFICATION AND PUMPING EXPENSES
Line Item Detail

Purification and Pumping Expenses

	2025 Year to Date	2025 Budget	YTD % of Budget
LEMONT BOOSTER STATION			
420.331 Operating Supplies and Expense	0	0	0%
420.332 Power Purchased	3,400	5,200	65%
420.333 Equipment Maintenance	677	1,000	68%
420.334 Structure Maintenance	0	0	0%
Subtotal	**4,077**	**6,200**	66%
SPRING CREEK PARK WELL			
425.361 Operating Supplies and Expense	0	0	0%
425.362 Power Purchased	12,018	25,690	47%
425.363 Equipment Maintenance	2,912	10,000	29%
425.364 Structure Maintenance	785	750	105%
425.365 Well Monitoring Costs	0	0	0%
425.367 Easement Costs	0	5,778	0%
Subtotal	**15,715**	**42,218**	37%
ROGERS WELL			
430.371 Operating Supplies and Expense	0	0	0%
430.372 Power Purchased	17,627	40,200	44%
430.373 Equipment Maintenance	7,308	11,500	64%
430.374 Structure Maintenance	369	1,000	37%
430.375 Well Monitoring Costs	432	850	51%
Subtotal	**25,736**	**53,550**	48%

PURIFICATION AND PUMPING EXPENSES
Line Item Detail

Purification and Pumping Expenses

	2025 Year to Date	2025 Budget	YTD % of Budget
OAK HALL WELL			
435.391 Operating Supplies and Expense	0	0	0%
435.392 Power Purchased	399	840	48%
435.393 Equipment Maintenance	2,845	0	0%
435.394 Structure Maintenance	731	2,500	29%
435.395 Well Monitoring Costs	0	0	0%
Subtotal	**3,975**	**3,340**	119%
INTERCONNECTIONS - SCBWA ,PSU, and BELLEFONTE			
440.386 Purchased Water	35	70	50%
440.388 Interconnection Maintenance	0	0	0%
Subtotal	**35**	**70**	50%
TOTAL PUMPING	**51,014**	**113,848**	45%
TOTAL PURIFICATION AND PUMPING	**70,971**	**168,848**	42%

DISTRIBUTION SYSTEM EXPENSES
Line Item Detail

Distribution System Expenses

	2025 Year to Date	2025 Budget	YTD % of Budget
STORAGE-DALE ST RESERVOIR			
455.341 Operating Supplies and Expense	0	0	0%
455.342 Power Purchased	108	200	54%
455.343 Equipment Maintenance	22	0	0%
455.344 Structure Maintenance	0	1,000	0%
Subtotal	**130**	**1,200**	11%
STORAGE-STRUBLE RD TANK			
456.351 Operating Supplies and Expense	0	0	0%
456.352 Power Purchased	198	450	44%
456.353 Equipment Maintenance	0	250	0%
456.354 Structure Maintenance	102	0	102%
Subtotal	**300**	**700**	43%
MAINTENANCE-DISTRIBUTION SYSTEM			
460.475 Maintenance of Distribution / Trans Mains	15,034	25,000	60%
460.490 Maintenance of Service Lines	3,263	12,500	26%
460.495 Dumping Fees	920	1,500	61%
460.510 Maintenance of Hydrants	1,765	6,800	26%
460.530 Meter Supplies and Maintenance	14,627	8,000	183%
460.532 PRV - Penn Hills	0	0	0%
460.534 PRV - Independence Place	0	0	0%
460.536 PRV - Oak Hall	0	0	0%
460.537 PRV - Rockview North	0	0	0%
460.538 PRV - Rockview South	0	0	0%
460.539 PRV - Bellefonte Interconnect	0	0	0%
460.541 PRV - Nittany Commons	0	0	0%
Subtotal	**35,609**	**53,800**	66%

DISTRIBUTION SYSTEM EXPENSES
Line Item Detail

Distribution System Expenses

	2025 Year to Date	2025 Budget	YTD % of Budget
GENERAL-DISTRIBUTION SYSTEM			
465.181 Contract Labor - College Twp Personnel	36,043	65,000	55%
465.540 Contract Labor - Technicians	156,319	289,000	54%
465.556 Leak Detection Services	0	0	0%
465.575 R-O-W, Regulatory Compliance	10,730	13,500	79%
465.648 PA One Call Service	306	775	39%
465.760 Small Tools and Minor Equipment	1,612	4,000	40%
465.761 Repairs and Maintenance-Water Equip	29,938	25,000	120%
465.762 Safety Equipment	0	0	0%
Subtotal	**234,948**	**397,275**	59%
TOTAL DISTRIBUTION SYSTEM	**270,987**	**452,975**	60%

GENERAL EXPENSES
Line Item Detail

General Expenses

	2025 Year to Date	2025 Budget	YTD % of Budget
OFFICE			
482.600 Contract Labor - Billing and Cust Serv	39,485	81,143	49%
482.605 Contract Labor - College Twp Personnel	0	11,517	0%
482.610 Contract Labor - Meter Reading	0	0	0%
482.612 Professional Employment Services	0	0	0%
482.620 Office and Other Supplies	1,923	2,500	77%
482.621 Computer and Software Maintenance	0	0	0%
482.625 Postage and Freight Charges	4,684	10,000	47%
482.641 Advertising	287	1,500	19%
482.643 IT Services/Support/Software	18,750	18,775	100%
482.645 Telephone	564	1,200	47%
482.647 Cellular Phone	345	825	42%
482.655 Uncollectible Accounts	0	0	0%
Subtotal	**66,038**	**127,460**	52%
GENERAL PROPERTY			
485.702 Vehicle Repairs and Maintenance	793	5,700	14%
485.731 Vehicle Fuels: Gas, Diesel, Oil, Etc	6,363	11,500	55%
485.735 Repairs of Tools and Machinery	110	1,800	6%
485.740 Materials and Supplies	3,857	12,500	31%
485.765 Radio/Paging Equipment and Maint	0	100	0%
485.770 Rental of Equipment	960	15,000	6%
Subtotal	**12,083**	**46,600**	26%
ENGINEERING AND PROFESSIONAL			
488.810 Engineering - Consulting	27,061	49,500	55%
488.818 Engineering - Inspection	0	0	0%
488.840 Accounting and Audit	8,000	15,000	53%
488.845 Legal	4,122	14,000	29%
488.850 Professional - Other	4,243	4,000	106%
Subtotal	**43,426**	**82,500**	53%

GENERAL EXPENSES
Line Item Detail

General Expenses

	2025 Year to Date	2025 Budget	YTD % of Budget
TAXES, BENEFITS, AND INSURANCE			
491.615 Training - Distribution and Office	60	1,200	5%
491.618 Conventions	1,390	1,800	77%
491.738 Clothing and Uniforms	1,575	1,875	84%
491.802 Dues, Subscriptions, and Memberships	3,128	3,100	101%
491.855 Insurance Policies	14,402	30,955	47%
491.858 Workers' Compensation Insurance	3,702	8,950	41%
491.860 Pension Expense	13,179	23,137	57%
491.865 Bond	513	510	101%
491.870 Medical / Dental / Vision Insurance	114,904	221,682	52%
491.871 Health Insurance Opt-Out Program	0	0	0%
491.875 Group Term Life/Disability Insurance	2,353	4,788	49%
491.880 Payroll Taxes - FICA	15,095	29,844	51%
491.881 Unemployment Compensation Insurance	1,460	1,290	113%
Subtotal	**171,761**	**329,131**	52%
MISCELLANEOUS			
494.885 Operational and Management Agreement	63,352	128,445	49%
494.470 Miscellaneous	166	0	0%
494.460 Board, Staff, and Professional Meetings	0	0	0%
497.895 Loss (Gain) on Disposal of Assets	0	0	0%
Subtotal	**63,518**	**128,445**	49%
TOTAL GENERAL EXPENSE	**356,826**	**714,136**	50%

NON-OPERATING INCOME (EXPENSE)
Line Item Detail

Non- Operating Income (Expense)

	2025 Year to Date	2025 Budget	YTD % of Budget
NON-OPERATING INCOME (EXPENSE)			
341.000 Investment Income	3,135	24,000	13%
NET NON-OPERATING INCOME (EXP)	**3,135**	**24,000**	13%

NB-1

CENTRE COUNTY 2025

HAZARD MITIGATION PLAN UPDATE



PREPARED FOR:

Centre County
Office of Emergency Services
Planning and Community Development Office
420 Holmes Street
Bellefonte, Pennsylvania 16823

PREPARED BY:

Michael Baker International, Inc.
1818 Market Street, Suite 3110
Philadelphia, Pennsylvania 19103

CENTRE COUNTY PENNSYLVANIA

Michael Baker INTERNATIONAL

CERTIFICATION OF ANNUAL REVIEW MEETINGS

The Centre County Hazard Mitigation Steering Committee (HMSC) has reviewed this Hazard Mitigation Plan (HMP) Update. See Section 8 for further details regarding this form. The HMSC hereby certifies the review.

Year	Date of Meeting	Public Outreach Addressed?*	Signature
2021	N/A	N/A	To the best knowledge of the Centre County HMSC, no HMP meetings were held before the beginning of the HMP Update process. See Section 3 of the Centre County 2025 HMP Update for details regarding the meetings held during this process
2022	N/A	N/A	
2023	N/A	N/A	
2024	N/A	N/A	
2025	See Section 3	See Section 3	

**Confirm yes here annually and describe on record of changes page.*

RECORD OF CHANGES

Date	DESCRIPTION OF CHANGE MADE, MITIGATION ACTION COMPLETED, OR PUBLIC OUTREACH PERFORMED	CHANGE MADE BY (PRINT NAME)	CHANGE MADE BY (SIGNATURE)
2021 - 2025	To the best knowledge of the Centre County HMSC, no HMP progress reports were submitted from municipalities for the period from 2021 through 2025, although mitigation actions were accomplished in this period. Progress on actions is discussed in detail in Section 6.1 of this plan.	N/A	N/A

REMINDER: Please attach all associated meeting agendas, sign-in sheets, handouts, and minutes.

TABLE OF CONTENTS

CERTIFICATION OF ANNUAL REVIEW MEETINGS I
RECORD OF CHANGES II
TABLE OF CONTENTS III
TABLE OF TABLES XII
TABLE OF FIGURES XIX
ACRONYMS XXIII
1. INTRODUCTION 1
1.1 Background 1
1.2 Purpose 1
1.3 Scope 2
1.4 Authority and Reference 3
2. COMMUNITY PROFILE 5
2.1 Geography and Environment 5
2.2 Community Facts 8
2.3 Population and Demographics 10
2.4 Equity in Hazard Mitigation Planning 14
2.5 Land Use and Development 18
2.6 Data Sources 20
3. PLANNING PROCESS 30
3.1 Update Process and Participation Summary 30
3.2 The Planning Team 33
3.3 Meetings and Documentation 37
3.4 Public and Stakeholder Participation 41
3.5 Multi-Jurisdictional Planning 44
4. RISK ASSESSMENT 50
4.1 Update Process Summary 50
4.2 Hazard Identification 52
4.2.1 Table of Presidential Disaster Declarations 52
4.2.2 Summary of Hazards 53
4.3 Hazard Profiles 60
Natural Hazards 60

4.3.1 Drought 60
4.3.1.1 Location and Extent 60
4.3.1.2 Range of Magnitude 62
4.3.1.3 Past Occurrence 65
4.3.1.4 Future Occurrence 70
4.3.1.5 Vulnerability Assessment 72
4.3.1.6 Equity in Vulnerable Communities 75
4.3.2 Earthquakes 77
4.3.2.1 Location and Extent 77
4.3.2.2 Range of Magnitude 79
4.3.2.3 Past Occurrence 81
4.3.2.4 Future Occurrence 83
4.3.2.5 Vulnerability Assessment 83
4.3.2.6 Equity in Vulnerable Communities 85
4.3.3 Extreme Temperature 86
4.3.3.1 Location and Extent 86
4.3.3.2 Range of Magnitude 89
4.3.3.3 Past Occurrence 91
4.3.3.4 Future Occurrence 93
4.3.3.5 Vulnerability Assessment 95
4.3.3.6 Equity In Vulnerable Communities 96
4.3.4 Flood, Flash Flood, Ice Jam 97
4.3.4.1 Location and Extent 97
4.3.4.2 Range of Magnitude 102
4.3.4.3 Past Occurrence 105
4.3.4.4 Future Occurrence 120
4.3.4.5 Vulnerability Assessment 123
4.3.4.6 Equity in Vulnerable Communities 131
4.3.5 Hurricane, Tropical Storm, Nor'easter 132
4.3.5.1 Location and Extent 132
4.3.5.2 Range of Magnitude 134

4.3.5.3 Past Occurrence 136
4.3.5.4 Future Occurrence 139
4.3.5.5 Vulnerability Assessment 140
4.3.5.6 Equity in Vulnerable Communities 141
4.3.6 Landslide 142
4.3.6.1 Location and Extent 142
4.3.6.2 Range of Magnitude 145
4.3.6.3 Past Occurrence 146
4.3.6.4 Future Occurrence 148
4.3.6.5 Vulnerability Assessment 149
4.3.6.6 Equity in Vulnerable Communities 156
4.3.7 Lightning Strike 157
4.3.7.1 Location and Extent 157
4.3.7.2 Range of Magnitude 157
4.3.7.3 Past Occurrence 158
4.3.7.4 Future Occurrence 159
4.3.7.5 Vulnerability Assessment 161
4.3.7.6 Equity In Vulnerable Communities 162
4.3.8 Radon Exposure 162
4.3.8.1 Location and Extent 162
4.3.8.2 Range of Magnitude 171
4.3.8.3 Past Occurrence 173
4.3.8.4 Future Occurrence 175
4.3.8.5 Vulnerability Assessment 176
4.3.8.6 Equity in Vulnerable Communities 177
4.3.9 Pandemic and Infectious Disease 178
4.3.9.1 Location and Extent 178
4.3.9.2 Range of Magnitude 179
4.3.9.3 Past Occurrence 182
4.3.9.4 Future Occurrence 185
4.3.9.5 Vulnerability Assessment 185

4.3.9.6 Equity in Vulnerable Communities 187
4.3.10 Subsidence, Sinkhole 188
4.3.10.1 Location and Extent 188
4.3.10.2 Range of Magnitude 190
4.3.10.3 Past Occurrence 190
4.3.10.4 Future Occurrence 192
4.3.10.5 Vulnerability Assessment 193
4.3.10.6 Equity in Vulnerable Communities 200
4.3.11 Tornado, Windstorm 201
4.3.11.1 Location and Extent 201
4.3.11.2 Range of Magnitude 202
4.3.11.3 Past Occurrence 204
4.3.11.4 Future Occurrence 208
4.3.11.5 Vulnerability Assessment 208
4.3.11.6 Equity in Vulnerable Communities 211
4.3.12 Wildfire 212
4.3.12.1 Location and Extent 212
4.3.12.2 Range of Magnitude 212
4.3.12.3 Past Occurrence 214
4.3.12.4 Future Occurrence 219
4.3.12.5 Vulnerability Assessment 221
4.3.12.6 Equity in Vulnerable Communities 230
4.3.13 Winter Storm 231
4.3.13.1 Location and Extent 231
4.3.13.2 Range of Magnitude 233
4.3.13.3 Past Occurrence 234
4.3.13.4 Future Occurrence 236
4.3.13.5 Vulnerability Assessment 237
4.3.13.6 Equity in Vulnerable Communities 240
Human-Made Hazards 241
4.3.14 Civil Disturbance 241

4.3.14.1 Location and Extent *241*
4.3.14.2 Range of Magnitude *242*
4.3.14.3 Past Occurrence *244*
4.3.14.4 Future Occurrence *246*
4.3.14.5 Vulnerability Assessment *246*
4.3.14.6 Equity in Vulnerable Communities *247*
4.3.15 Cyber Terrorism 248
4.3.15.1 Location and Extent *248*
4.3.15.2 Range of Magnitude *250*
4.3.15.3 Past Occurrence *251*
4.3.15.4 Future Occurrence *253*
4.3.15.5 Vulnerability Assessment *253*
4.3.15.6 Equity in Vulnerable Communities *254*
4.3.16 Dam Failure 255
4.3.17 Environmental Hazards – Coal Mining 256
4.3.17.1 Location and Extent *256*
4.3.17.2 Range of Magnitude *260*
4.3.17.3 Past Occurrence *261*
4.3.17.4 Future Occurrence *261*
4.3.17.5 Vulnerability Assessment *262*
4.3.17.6 Equity in Vulnerable Communities *264*
4.3.18 Environmental Hazards – Gas and Liquid Pipelines 265
4.3.18.1 Location and Extent *265*
4.3.18.2 Range of Magnitude *268*
4.3.18.3 Past Occurrence *270*
4.3.18.4 Future Occurrence *270*
4.3.18.5 Vulnerability Assessment *271*
4.3.18.6 Equity in Vulnerable Communities *274*
4.3.19 Environmental Hazards – Hazardous Material Release 275
4.3.19.1 Location and Extent *275*
4.3.19.2 Range of Magnitude *278*

4.3.19.3 Past Occurrence *280*
4.3.19.4 Future Occurrence *287*
4.3.19.5 Vulnerability Assessment *287*
4.3.19.6 Equity in Vulnerable Communities *289*
4.3.20 Environmental Hazards – Conventional Oil and Gas Wells 290
4.3.20.1 Location and Extent *290*
4.3.20.2 Range of Magnitude *290*
4.3.20.3 Past Occurrence *293*
4.3.20.4 Future Occurrence *294*
4.3.20.5 Vulnerability Assessment *294*
4.3.20.6 Equity in Vulnerable Communities *296*
4.3.21 Environmental Hazards – Unconventional Oil and Gas Wells 297
4.3.21.1 Location and Extent *297*
4.3.21.2 Range of Magnitude *297*
4.3.21.3 Past Occurrence *300*
4.3.21.4 Future Occurrence *301*
4.3.21.5 Vulnerability Assessment *301*
4.3.21.6 Equity in Vulnerable Communities *301*
4.3.22 Nuclear Incidents 302
4.3.22.1 Location and Extent *302*
4.3.22.2 Range of Magnitude *304*
4.3.22.3 Past Occurrence *306*
4.3.22.4 Future Occurrence *307*
4.3.22.5 Vulnerability Assessment *308*
4.3.22.6 Equity in Vulnerable Considerations *308*
4.3.23 Substance Use Disorder 309
4.3.23.1 Location and Extent *309*
4.3.23.2 Range of Magnitude *310*
4.3.23.3 Past Occurrence *311*
4.3.23.4 Future Occurrence *312*
4.3.23.5 Vulnerability Assessment *312*

4.3.23.6 Equity in Vulnerable Communities 313
4.3.24 Terrorism 314
4.3.24.1 Location and Extent 314
4.3.24.2 Range of Magnitude 315
4.3.24.3 Past Occurrence 317
4.3.24.4 Future Occurrence 318
4.3.24.5 Vulnerability Assessment 318
4.3.24.6 Equity in Vulnerable Communities 320
4.3.25 Transportation Incidents 321
4.3.25.1 Location and Extent 321
4.3.25.2 Range of Magnitude 321
4.3.25.3 Past Occurrence 325
4.3.25.4 Future Occurrence 330
4.3.25.5 Vulnerability Assessment 330
4.3.25.6 Equity in Vulnerable Communities 338
4.3.26 Urban Fire and Explosion 339
4.3.26.1 Location and Extent 339
4.3.26.2 Range of Magnitude 339
4.3.26.3 Past Occurrence 341
4.3.26.4 Future Occurrence 342
4.3.26.5 Vulnerability Assessment 343
4.3.26.6 Equity in Vulnerable Communities 343
4.3.27 Utility Interruption 344
4.3.27.1 Location and Extent 344
4.3.27.2 Range of Magnitude 345
4.3.27.3 Past Occurrence 347
4.3.27.4 Future Occurrence 347
4.3.27.5 Vulnerability Assessment 348
4.3.27.6 Equity in Vulnerable Communities 349
4.4 Hazard Vulnerability Summary 350
4.4.1 Methodology 350

4.4.2 Ranking Results 352
4.4.2.1 Historic Losses 360
4.4.2.2 Current Condition Losses 363
4.4.2.3 Predictive Losses 366
4.4.3 Future Development and Vulnerability 368
4.4.4 Community Survey 381
5. CAPABILITY ASSESSMENT 382
5.1 Update Process Summary 382
5.2 Capability Assessment Findings 383
5.2.1 Planning and Regulatory Capability 383
5.2.1.1 Participation in the National Flood Insurance Program 396
5.2.2 Administrative and Technical Capability 405
5.2.3 Financial Capability 410
5.2.4 Education and Outreach Capability 415
5.2.5 Socially Vulnerable or Underserved Communities 419
CentreHelps 419
Out of the Cold 420
Centre County Office of Veterans Affairs 421
5.2.6 Plan Integration 421
Comprehensive Plans 422
Transportation Plans 422
Climate Action Plans (CAP) 423
Ordinances and Codes 423
Emergency Management 424
Integration Capabilities 425
6. MITIGATION STRATEGY 427
6.1 Mitigation Strategy Update Process Summary 427
6.1.1 Mitigation Goal and Objective Review 427
6.1.2 Mitigation Action Review 430
6.1.3 Mitigation Successes 443
Flood Mitigation Successes 443
Pandemic Successes 443

Utility Interruption Successes *443*
Wildfire and Urban Fire Mitigation Successes *443*
Subsidence and Sinkhole Mitigation Successes *444*
Planning and Regulatory Successes *444*
Structure and Infrastructure Successes *444*
Emergency Response Successes *444*
Community Development Block Grant (CDBG) Funded Projects *445*
6.2 2021 Mitigation Goals and Objectives 446
6.3 Identification and Analysis of Mitigation Techniques 447
6.4 Mitigation Action Plan 456
7. PLAN MAINTENANCE 495
7.1 Update Process Summary 495
7.2 Monitoring, Evaluating, and Updating the Plan 495
7.3 Continued Public Involvement 497
8. PLAN ADOPTION 499
9. APPENDICES 502
Appendix A Bibliography 502
Appendix B Local Mitigation Plan Review Crosswalk 502
Appendix C Meeting and Other Participation Documentation 502
Appendix D Local and Regional Flood Vulnerability Maps 502
Appendix E Critical Facilities and Community Lifelines 502
Appendix F Hazus Methodology and Results Report 502
Appendix G Dam Failure Hazard Profile (Section 4.3.16) 502
Appendix H Outreach and Engagement Plan 502

TABLE OF TABLES

Table 2.2-1: Centre County Population Change, 1960-2022 (U.S. Census, American Community Survey (ACS)) 8
Table 2.3-1: Centre County Population by Municipality, 2010-2022 (U.S. Census Bureau, ACS, 2022) 11
Table 2.4-1: Underserved and Socially Vulnerable Census Tracts in Centre County (FEMA, 2024) 16
Table 2.6-1: Critical Facilities in Centre County by Type and Data Source 23
Table 2.6-2: Types of Critical Facilities in Centre County 25
Table 2.6-3: Critical Facilities by Municipality and Type 27
Table 3.2-1: 2025 Centre County HMPT Participants 33
Table 3.3-1: Risk Assessment Meetings 38
Table 3.5-1: 2025 Centre County Stakeholder Participation 45
Table 4.1-1: Natural and Human-Made Hazards by Year Identified for Inclusion in Centre County HMP 51
Table 4.2-1: Presidential Disaster and Emergency Declarations affecting Centre County (FEMA, 2024d) 52
Table 4.2-2: Descriptions of Natural and Human-Made Hazard Profiled in the 2025 HMP Update (PEMA, 2020) 54
Table 4.3.1-1: Palmer Drought Severity Index (PSDI) Classifications (NOAA, 2024a) 62
Table 4.3.1-2: Most Likely Lifelines Impacted by Drought 65
Table 4.3.1-3: Centre County Declared Drought Status from 1980 to 2024 (PA DEP, 2024a) 66
Table 4.3.1-4: Crop Loss Insurance Compensation Due to Drought (USDA, 2024) 68
Table 4.3.1-5: PaGWIS Domestic Water Wells Drilled per Municipality (PAGWIS, 2024) 72
Table 4.3.1-6: Top Livestock Inventory Items in Centre County (USDA, 2022) 74
Table 4.3.2-1: Richter Scale Magnitudes and Associated Earthquake Size Effects 79
Table 4.3.2-2: Modified Mercalli Intensity Scale with Associated Impacts 80
Table 4.3.2-3: Most Likely Lifelines Impacted by Earthquakes 81

Table 4.3.2-4: Structures at Least 55 Years Old by Municipality (US Census, 2022) 84
Table 4.3.3-1: Most Likely Lifelines Affected by Extreme Temperature 91
Table 4.3.3-2: Previous Temperature Extremes Impacting Centre County, 2004-2024 (NOAA NCEI, 2024a) 92
Table 4.3.3-3: Populations Vulnerable to Extreme Temperatures by Municipality (US Census, 2022) 95
Table 4.3.4-1: Most Likely Lifelines Impacted by Floods, Flash Foods, and Ice Jams 105
Table 4.3.4-2: Flood, Flash Flood, and Heavy Rain Events Impacting Centre County from 1993-2024 (NCEI NOAA, 2024) 108
Table 4.3.4-3: Centre County Municipal Participation in the NFIP (FEMA CIS, 2024b) 116
Table 4.3.4-4: Centre County NFIP Polices and Claims Information (FEMA CIS, 2024a) (FEMA CIS, 2024b) 117
Table 4.3.4-5: Summary of the Number and Type of Repetitive Loss Properties by Municipality (FEMA, 2024a) 120
Table 4.3.4-6: Recurrence Intervals and Associated Probabilities of Occurrence (USGS, 2024) 121
Table 4.3.4-7: Community Flood Vulnerability in Centre County, 2024 125
Table 4.3.4-8: Structures Vulnerable to Flooding (in SHFA) by Municipality and Land Use Type in Centre County, 2024 127
Table 4.3.4-9: Conventional and Unconventional Oil and Gas Well Flood Vulnerability in Centre County, 2024 129
Table 4.3.4-10: Mobile Home Flood Vulnerability in Centre County 130
Table 4.3.5-1: Saffir-Simpson Scale Categories with Associated Wind Speeds and Damages (NHC, 2021) 135
Table 4.3.5-2: Most Likely Lifelines Impacted by Hurricanes, Tropical Storms, or Nor'easter 136
Table 4.3.5-3: Previous Tropical Storm Events Affecting Centre County (NOAA NCEI, 2024) 136
Table 4.3.5-4: Distribution of Flood Damages by Municipality and Flood Source from Tropical Storm Agnes 139
Table 4.3.5-5: Annual Probability of Tropical Storm and Hurricane Strength Wind Speeds in Centre County and Surrounding Areas (FEMA, 2000) 139

Table 4.3.6-1: Most Likely Lifelines Impacted by Landslide 146
Table 4.3.6-2: Heavy Rain and Heavy Snow Events in Centre County (NOAA NCEI, 2024) 146
Table 4.3.6-3: Structures and Critical Facilities Vulnerable to Landslides in Centre County, 2024 151
Table 4.3.6-4: Structure by Land Use Landslide Vulnerability in Centre County, 2024 153
Table 4.3.6-5: Conventional and Unconventional Oil and Gas Well Landslide Vulnerability in Centre County, 2024 156
Table 4.3.7-1: Most Likely Lifelines Impacted by Lightning Strike 158
Table 4.3.8-1: Radon Risk for Smokers and Non-Smokers (US EPA, 2016) 171
Table 4.3.8-2: Most Likely Lifelines Impacted by Radon Exposure 172
Table 4.3.8-3: Radon Level Tests and Results in Centre County Zip Codes (PA DEP, 2024c) 173
Table 4.3.9-1: Projections of Severe Influenza Impact (Penn State University Pandemic Response Plan) 180
Table 4.3.9-2: Most Likely Lifelines Impacted by Pandemic and Infectious Diseases 181
Table 4.3.9-3: Significant Influenza Outbreaks over the Past Century (Global Security, 2009; WHO, 2009) 182
Table 4.3.9-4: Number of Flu Cases in Centre County by Flu Season (PA DOH, 2020a) 182
Table 4.3.9-5: Cumulative COVID-19 Cases and Total Deaths in Centre County 2020-2023 (PA DOH, 2020b) (PA Open Data, 2024) 183
Table 4.3.10-1: Most Likely Lifelines Impacted by Subsidence and Sinkholes 190
Table 4.3.10-2: Number of Sinkholes per Municipality in Centre County (DCNR, 2024) 190
Table 4.3.10-3: Structures and Critical Facilities Vulnerable to Subsidence, 2024 195
Table 4.3.10-4: Structures Vulnerable to Subsidence by Municipality and Land Use Type in Centre County, 2024 197
Table 4.3.11-1: Enhanced Fujita Scale (EF-Scale) categories with associated wind speeds 202
Table 4.3.11-2: Expected Tornado Damages 202

Table 4.3.11-3: Most likely lifelines impacted by Tornadoes or Windstorms..... 204
Table 4.3.11-4: Previous Tornado Events in Centre County (NOAA NCEI, 2020a, Rushton, 2023) 205
Table 4.3.11-5: Mobile homes in Centre County (U.S. Census Bureau, 2018) 210
Table 4.3.12-1: Most Likely Lifelines Impacted by Wildfire 214
Table 4.3.12-2: EMS Logged Wildfire Events 2021 through 2024 215
Table 4.3.12-3: Structures and Critical Facilities Vulnerable to Wildfire, 2024..... 225
Table 4.3.12-4: Structures Vulnerable to Wildfire by Municipality and Land Use Type in Centre County, 2024 227
Table 4.3.12-5: Conventional and Unconventional Oil and Gas Well Wildfire Vulnerability in Centre County, 2024 230
Table 4.3.13-1: Most Likely Lifelines Impacted by Winter Storm 234
Table 4.3.13-2: Previous Winter Storm Events Impacting Centre County from 1996-2022 (NOAA NCEI, 2024) 235
Table 4.3.13-3: Housing Units Built Prior to 1940 in Centre County (U.S. Census Bureau, 2018-2022)..... 239
Table 4.3.14-1: Most Likely Lifelines Impacted by Civil Disturbance..... 244
Table 4.3.15-1: Methods of Cyberattacks (PA DHS, 2017) 248
Table 4.3.15-2: Most Likely Lifelines Impacted by Cyberterrorism 251
Table 4.3.17-1: Number of Mines by Type in Centre County Municipalities (PA DEP, 2024d)..... 258
Table 4.3.17-2: Most Likely Lifelines Impacted by Coal Mining..... 260
Table 4.3.17-3: Structures and Critical Facilities Vulnerable to Coal Mines in Centre County 263
Table 4.3.17-4: Structure by Land Use Coal Mining Vulnerability in Centre County 263
Table 4.3.18-1: Most Likely Lifelines Impacted by Pipelines..... 270
Table 4.3.18-2: Structures and Critical Facilities Vulnerable Liquid and Gas Pipelines 272
Table 4.3.18-3: Structures Vulnerable to Liquid and Gas Pipelines by Generalized Land Use Type 273
Table 4.3.19-1: TRI Facilities in Centre County 277
Table 4.3.19-2: Most Likely Lifelines Impacted by Hazardous Materials Release 279

Table 4.3.19-3: Hazardous Materials Releases in Centre County OES Incident Log (Centre County EMA, 2024) 281
Table 4.3.19-4: Hazardous Materials Release Events in Centre County (Centre County EMA, 2024) 284
Table 4.3.19-5: Structures and Critical Facilities Vulnerable to Hazardous Materials Release, 2024..... 288
Table 4.3.20-1: Most Likely Lifelines Impacted by Conventional Oil and Gas Wells 292
Table 4.3.20-2: Oil and Gas Well Drilling Incidents Recorded in Centre County (Centre County EMA, 2024) 293
Table 4.3.20-3: Structures and Critical Facilities Vulnerable to Conventional Oil and Gas Wells, 2024..... 295
Table 4.3.21-1: Most Likely Lifelines Impacted by Unconventional Oil and Gas Wells..... 300
Table 4.3.21-2: Structures and Critical Facilities Vulnerable to Unconventional Oil and Gas Wells, 2024..... 301
Table 4.3.22-1: Most Likely Lifelines Impacted by Nuclear Incidents 306
Table 4.3.23-1: Most Likely Lifelines Impacted by Substance Abuse 311
Table 4.3.23-2: Number of Overdose Deaths in Centre County from 2015-2024 (Centre County Coroner's Office, 2024) 311
Table 4.3.24-1: Most Likely Lifelines Impacted by Terrorism..... 316
Table 4.3.24-2: Terrorist Activity Recorded in Centre County OES Incident Log (Centre County EMA, 2024) 317
Table 4.3.25-1: Most Likely Lifelines Impacted by Transportation Incidents 322
Table 4.3.25-2: Reportable Traffic Crash Data, 2009-2019 (PennDOT, 2023)..... 325
Table 4.3.25-3: Total Pedestrian Deaths and Injuries in Centre County by Age Group 2009-2023 (PennDOT, 2024). 327
Table 4.3.25-4: Transportation Incidents Recorded in Centre County OES Incident Log January through August 2024 (Centre County EMA, 2024) 328
Table 4.3.25-5: Structures Vulnerable to Transportation Incidents, 2024..... 332
Table 4.3.25-6: Critical Facilities Vulnerable to Transportation Incidents, 2024 ... 334
Table 4.3.25-7: Population Vulnerable to Transportation Incidents 336
Table 4.3.26-1: Most Likely Lifelines Impacted by Urban Explosion and Fire 340

Table 4.3.26-2: Structure Fires Recorded in Centre County OES Incident Log (Centre County EMA, 2024) 341
Table 4.3.27-1: Most Likely Lifelines Impacted by Utility Interruption 346
Table 4.3.27-2: Utility Emergencies Recorded in Centre County OES Incident Log (Centre County EMA, 2024) 347
Table 4.4-1: Summary of Risk Factor Approach 351
Table 4.4-2: Ranking of Hazard Types Based on Risk Factor Methodology ... 352
Table 4.4-3: Jurisdictional Risk Evaluation 355
Table 4.4-4: Historic Insured Crop Losses, 1989-2024 (USDA RMA, 2024) 361
Table 4.4-5: Centre County NFIP Polices and Claims Information (FEMA CIS, 2024a) (FEMA CIS, 2024b) 362
Table 4.4-6: Centre County Tax Assessed Building Values (Centre County, 2024) 364
Table 4.4-7: Centre County population data and projections (U.S. Census, 2022; Center for Rural Pennsylvania, 2023) 368
Table 4.4-8: Centre County Subdivision and Land Development Data (CCPCDO, 2022) 376
Table 4.4-9: Effects of Potential Population, Land Use, and Development Changes on Hazard Impacts by Planning Region 379
Table 5.1-1: Relevant Departments and Documents 383
Table 5.2-1: Small Area Plans Developed by the CRPA 391
Table 5.2-2: Summary of Planning Tools Adopted by Each Municipality in Centre County (Centre County, 2022b) 394
Table 5.2-3: Centre County NFIP Information by Municipality (FEMA PIVOT, 2025) 396
Table 5.2-4: Change in NFIP Policies and Coverage 2020-2025 (FEMA PIVOT, 2025) 398
Table 5.2-5: Floodplain Administrator for Each Municipality (PA DCED, 2025) 400
Table 5.2-5: Self-Assessment Capability Responses Expressed as a Percentage of Responses Received 426
Table 6.1-1: Review of Changes to the 2021 HMP Goals and Objectives 428
Table 6.1-2: Five-Year Mitigation Plan Action Review 431
Table 6.1-3: CDBG Funded Projects 2021 through 2023 445

Table 6.2-1: 2025 Goals and Objectives 446
Table 6.3-1: Mitigation Techniques for All Hazards in Centre County 448
Table 6.3-2: Mitigation Actions Per Hazard for Each Municipality 450
Table 6.4-1: 2025 Centre County Mitigation Action Plan 457
Table 6.4-2: Mitigation Action Prioritization 485

TABLE OF FIGURES

Figure 2.1-1: Centre County Courthouse (CCPCDO, 2017) 5
Figure 2.1-2: Philipsburg Borough, Centre County (CCPCDO, 2017) 5
Figure 2.1-3: Philipsburg Borough, Centre County (CCPCDO, 2017) 5
Figure 2.1-4: Centre County Base Map 6
Figure 2.1-5: Centre County Watersheds 7
Figure 2.2-1: Centre County Planning Regions 9
Figure 2.3-1: Central PA Festival of the Arts, State College (CCPCDO, 2017) .. 13
Figure 2.4-1: FEMA Community Resilience Challenges Index (CRCI) Census Tracts in Centre County (FEMA CRCI, 2024) 15
Figure 2.5-1: 2024 Centre County Land Use 19
Figure 2.6-1: Community Lifelines 23
Figure 3.1-1: Centre County HMP Stakeholder Types 31
Figure 3.1-2: Centre County 2025 HMSC Members 32
Figure 3.3-1: Open House Flyer 39
Figure 3.3-2: Instagram Post Advertising the Public Survey 41
Figure 3.4-1: Draft Plan Review Meeting Flyer 43
Figure 3.4-2: Notice of HMP Meetings Posted on the Project Website 44
Figure 4.3.1-1: Centre County Agricultural Land Use, 2024 61
Figure 4.3.1-2: Weeks in Drought for Centre County from 2000 through 2024 69
Figure 4.3.1-3: Centre County Drought Hazard Assessment Report (CRMA, 2024) ... 71
Figure 4.3.1-4: Public Water Supply in Centre County, 2024 76
Figure 4.3.2-1: Approximate USGS Seismic Hazard for Pennsylvania, 2023 78
Figure 4.3.2-2: Map of Earthquake Epicenters in Centre County, 2024 82
Figure 4.3.3-1: Average Minimum Temperature in Centre County, 2021 87
Figure 4.3.3-2: Average Maximum Temperature in Centre County, 2021 88
Figure 4.3.3-3: Effects of Wind Speed on Extreme Cold Events (Wind Chill) and Humidity on Extreme Heat Events (Heat Index) (NOAA NWS, 2024b) (NOAA NWS, 2024c) 90
Figure 4.3.3-4: Centre County Extreme Heat Hazard Assessment Report (CRMA, 2024) 94

Figure 4.3.4-1: Centre County Susquehanna River Basin Watersheds and Planning Districts (Spring Creek Watershed Commission, 2017) 98
Figure 4.3.4-2: Diagram Identifying the Special Flood Hazard Area, Floodway and Flood Fringe 99
Figure 4.3.4-3: FIRM Panel 42027C0368G, January 16, 2015 *(shows flood hazard areas along Spring Creek in Bellefonte, Benner, and Spring Townships)* 100
Figure 4.3.4-4: Special Flood Hazard Area in Centre County 101
Figure 4.3.4-4: Flooding along Fox Hollow Road in Patton Township, September 7, 2011 (Statecollege.com, 2011) 106
Figure 4.3.4-5: Flooding in Boalsburg in June 2014 Pushed Rocks onto Linden Hall Road (Bauer, 2014) 107
Figure 4.3.4-6: Flooding in Milesburg Borough in August 2024 107
Figure 4.3.4-7: Flooding in Unionville Borough in August 2024 107
Figure 4.3.4-8: Location of Ice Jam Reports in Centre County (1941-2024) 113
Figure 4.3.4-9: Location of Flash Flood Reports in Centre County, 2006-2024 114
Figure 4.3.4-3: Centre County Flooding Hazard Assessment Report (CRMA, 2024) 122
Figure 4.3.5-1: Wind Speed Zones in Centre County, 2012 133
Figure 4.3.5-2: Historic Coastal Storms in Pennsylvania, 2024 138
Figure 4.3.6-1: Landslide Susceptibility and Incidence in Centre County, 1997 . 143
Figure 4.3.6-2: Landslide Susceptibility by Slope Grade in Centre County, 2015 144
Figure 4.3.7-1: Total Lightning Density Events 160
Figure 4.3.8-1: Sketch of Radon Entry Points into a House (Arizona Geological Survey, 2006) 163
Figure 4.3.8-2: Radon Hazard Zones in Pennsylvania, 2021 166
Figure 4.3.8-3: Centre County Average Basement Radon Test Results, 2024 167
Figure 4.3.8-4: Centre County Maximum Basement Radon Test Results, 2024 ... 168
Figure 4.3.8-5: Centre County Average First Floor Radon Test Results, 2024 169
Figure 4.3.8-6: Centre County Maximum First Floor Radon Test Results, 2024 170
Figure 4.3.8-7: Radon System Manometer in Basement (Scott Home Inspection, 2017) (IRadon, 2024) 176
Figure 4.3.8-8: Radon Mitigation Systems (Scott Home Inspection, 2017) (IRadon, 2024) 176
Figure 4.3.9-1: COVID Test Site Opens in Centre County (Parish, 2020) 187

Figure 4.3.10-1: Areas Susceptible to Subsidence in Centre County, 2023 189
Figure 4.3.10-2: Sinkhole on Bigler Road on Penn State's campus (Murach, July 2015b) 191
Figure 4.3.10-3: Sinkhole Closes Road in Ferguson Township (Murach, July 2015a) 192
Figure 4.3.10-4: Workers repair sinkhole in Ferguson Township (Muthler & Hartley, 2018) 192
Figure 4.3.10-5: Christmas Day Sinkhole in Patton Township (Red Cross) 192
Figure 4.3.11-2: Trees after a wind event in Huston Township, August 2024 206
Figure 4.3.11-3: Tornado History in Centre County, 1950-2023 207
Figure 4.3.12-1: Wildfire History in Centre County, 2000-2024 218
Figure 4.3.12-2: Centre County Wildfire Hazard Assessment Report (CRMA, 2024) 220
Figure 4.3.12-1: Wildfire Hazard Potential in Centre County, 2023 222
Figure 4.3.12-3: Wooded Areas in Centre County 223
Figure 4.3.13-1: Seasonal Snowfall at State College, PA Co-Operative Observation Site, 1980-2022 (NOAA NWS, 2024b). 231
Figure 4.3.13-2: Mean Annual Snowfall for Pennsylvania and Centre County, 2021 232
Figure 4.3.13-3: 30-Year Snowfall Normal (Inches) by Month at State College Weather Station (NOAA NCEI, 2020b) 237
Figure 4.3.14-1: Riot at Penn State University in December 2011 (Penn State University, 2015a) 244
Figure 4.3.14-2: Demonstration in support of the Black Lives Matter movement in June, 2020 (Centre Daily Times, 2020) 245
Figure 4.3.17-1: Active and Abandoned Coal Mines in Centre County 259
Figure 4.3.18-1: Gas and Liquid Pipelines within Centre County 267
Figure 4.3.19-1: Locations Toxic Release Inventory (TRI) Facilities in Centre County, 2024 276
Figure 4.3.19-2: PFAS Study Area in Centre County (2024) 286
Figure 4.3.20-1: Conventional Oil and Gas Well Locations in Centre County 291
Figure 4.3.21-1: Unconventional Oil and Gas Well Locations in Centre County 298
Figure 4.3.22-1: Three Mile Island 306
Figure 4.3.22-2: Penn State Breazeale Nuclear Reactor (Penn State News, 2020) 307

Figure 4.3.25-1: Centre County Transportation Systems, 2024 323
Figure 4.3.25-2: Centre County Traffic Volume on Key Roadways, 2024 324
Figure 4.3.25-3: Centre County Transportation Crash Density, 2023 326
Figure 4.3.25-4: A Train Collides with a Dump Truck in Huston Township, May 2024 330
Figure 4.3.25-5: A Tractor Trailer Accident in Boggs Township, November 2024. 330
Table 4.3.25-6: Critical Facilities Vulnerable to Transportation Incidents, 2024 334
Figure 4.3.26-1: 2009 Fire at the Cadillac Building in Downtown Bellefonte 340
Figure 4.3.26-2: Arson Fire at the Hotel Do De in Bellefonte in September 2012 (Centre Daily Times, 2012) 340
Figure 4.3.27-1: Utility Facilities and Service Areas in Centre County (CCPCDO, 2019a) 345
Figure 4.4-1: Centre County Potential Loss Calculated with Hazus 367
Figure 4.4-2: Centre County Overall Growth by Planning Region (CCPCDO, 2015) 370
Figure 4.4-3: Centre County Impacts for Population and Employment (CCPCDO, 2015) 370
Figure 4.4-4: Centre County Regional Growth Boundaries – Official and Proposed (CCPCDO, 2015) 371
Figure 4.4-5: Future Land Use in the Centre Region (CRPA, 2013) 373
Figure 4.4-6: Future Land Use in the Nittany Valley Region (Nittany Valley Region Planning District, 2019) 374
Figure 4.4-7: Future Land Use in the Nittany Valley Region (Penns Valley Region Planning District, 2020) 375
Figure 5.2-1: Centre County Forest Zoning Districts (CCPCDO, 2013) 388
Figure 5.2-2: Centre County Municipalities with Ridge Overlay Districts (CCPCDO, 2013) 388
Figure 5.2-3: Centre County CRS Assessment 404
Figure 5.2-4: TRANSCAER Exercise in June 2024 419
Figure 5.2-5: USAR Exercise in October 2023 419

ACRONYMS

ACRONYM	DEFINITION
CCPC	Centre County Planning Commission
CCPCDO	Centre County Planning and Community Development Office
CFR	Code of Federal Regulations
CRS	Community Rating System
DCED	Department of Community and Economic Development
DCNR	Department of Conservation and Natural Resources
DCNR-BOF	Department of Conservation and Natural Resources-Bureau of Forestry
DMA	Disaster Mitigation Act
EMC	Emergency Management Coordinator
EMS	Emergency Medical Services
EOP	Emergency Operations Plan
EOC	Emergency Operations Center
EPA	Environmental Protection Agency
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FMA	Flood Mitigation Assistance Program
GIS	Geographic Information System
HHPD	High Hazard Potential Dam
HMGP	Hazard Mitigation Grant Program
HMP	Hazard Mitigation Plan
HMPT	Hazard Mitigation Planning Team
HMSC	Hazard Mitigation Steering Committee
IBC	International Building Code
ICC	International Code Council
NCDC	National Climatic Data Center
NCEI	National Centers for Environmental Information
NDIS	National Drought Information System
NDMC	National Drought Mitigation Center
NFIP	National Flood Insurance Program
NFPA	National Fire Protection Association
NHC	National Hurricane Center
NIDIS	National Integrated Drought Information System
NOAA	National Oceanic and Atmospheric Administration
NWS	National Weather Service
OES	Office of Emergency Services
PA DEP	Pennsylvania Department of Environmental Protection
PA DOH	Pennsylvania Department of Health

ACRONYM	DEFINITION
PaGWIS	Pennsylvania Groundwater Information System
PASDA	Pennsylvania Spatial Data Access
PDSI	Palmer Drought Severity Index
PEMA	Pennsylvania Emergency Management Agency
PennDOT	Pennsylvania Department of Transportation
RF	Risk Factor
SALDO	Subdivision and Land Development Ordinance
SFHA	Special Flood Hazard Area
SOG	Standard Operating Guide
UCC	Universal Construction Code
US DOT	United States Department of Transportation
USACE	United States Army Corps of Engineers
USDA	United States Department of Agriculture
USGS	United States Geological Survey
WYO	Write Your Own

1. INTRODUCTION

1.1 BACKGROUND

Across the United States, natural and human-made disasters have led to increasing levels of deaths, injuries, property damage, and interruption of business and government services. The time, money, and effort needed to recover from these disasters exhausts resources, diverting attention from important public programs. Since 1955, there have been 63 Presidential Disaster Declarations and Emergency Declarations in Pennsylvania, 15 of which have affected Centre County, Pennsylvania. The emergency management community, citizens, elected officials and other stakeholders in Centre County recognize the impact of disasters on their community and support proactive efforts needed to reduce the impact of natural and human-made hazards.



Office of Emergency Services and Planning and Community Development Office have taken an all-hazards approach to this Hazard Mitigation Plan Update.

Hazard mitigation is sustained action taken to prevent or minimize long-term risks to life and property from hazards. Pre-disaster mitigation actions are taken in advance of a hazard event and are essential to breaking the disaster cycle of damage, reconstruction and repeated damage. With careful selection, successful mitigation actions are cost-effective means of reducing risk of loss over the long-term.

Accordingly, the Centre County Hazard Mitigation Steering Committee (HMSC), composed of government leaders in the Centre County Office of Emergency Services (OES) and Centre County Planning and Community Development Office (CCPCDO), in cooperation with the elected officials of the County and its municipalities, have prepared this Hazard Mitigation Plan (HMP) Update. The Plan is the result of work by local officials and citizens of the County to develop a pre-disaster multi-hazard mitigation plan that will not only guide the County towards greater disaster resistance but will also respect the character and needs of the community.

1.2 PURPOSE

This HMP Update was developed for the purpose of:

- Providing a blueprint for reducing property damage and saving lives from the effects of future natural and human-caused disasters in Centre County;
- Complying with state and federal legislative requirements for County mitigation in order for the County to be eligible for federal and technical assistance from state and federal hazard mitigation programs;

- Identifying, introducing, and implementing cost-effective hazard mitigation measures in order to accomplish County goals and objectives and to raise awareness and acceptance of hazard mitigation;
- Demonstrating a firm local commitment to hazard mitigation principles; and
- Improving community resiliency following a disaster event.

Adoption of this plan supports Centre County and participating jurisdictions eligibility to apply for and receive certain federal grant funds that are administered by the Commonwealth of Pennsylvania for Federal Emergency Management Agency (FEMA). This plan complies with the requirements of the Disaster Mitigation Act of 2000 and its implementing regulations published in Title 44 of the Code of Federal Regulations (CFR) Section 201.6.

1.3 SCOPE

The Centre County 2025 HMP Update has been prepared to meet requirements set forth by FEMA and the Pennsylvania Emergency Management Agency (PEMA) in order for the County to be eligible for funding and technical assistance from state and federal hazard mitigation programs. It will be updated and maintained to address both natural and human-made hazards determined to be probable and/or present a risk for multiple deaths/injuries and property damages to the local municipalities within the County. Updates will take place following significant disasters or, at a minimum, this plan will be subject to review and update on an annual basis.

In accordance with the Disaster Mitigation Act (DMA) of 2000, the HMP Update documents the following topics:

- Planning Process;
- Hazard Identification;
- Risk Assessment;
- Mitigation Strategy: Goals, Objectives, and Actions;
- Formal Adoption by the Participating Jurisdictions; and
- PEMA and FEMA approval.

The report format is structured in accordance with the most current planning guidance from FEMA, Local Mitigation Planning Policy Guide (2022), and PEMA, Commonwealth of Pennsylvania's All-Hazard Mitigation Planning Standard Operating Guide (SOG) (2020). The overall format between the 2025 HMP Update and the 2021 HMP Update has remained largely unchanged.

It should be noted that future funding for mitigation projects will be contingent upon having each jurisdiction in Centre County adopt the plan. Any jurisdiction that does not adopt the 2025 HMP Update within one year of plan approval will be ineligible for pre-

and post-disaster mitigation funds and must take additional steps before adopting the plan.

1.4 AUTHORITY AND REFERENCE

Authority for this plan originates from the following federal sources:

- Robert T. Stafford Disaster Relief and Emergency Assistance Act, 42 U.S.C., Section 322, as amended.
- CFR, Title 44, Parts 201 and 206.
- Disaster Mitigation Act of 2000, Public Law 106-390, as amended.
- National Flood Insurance Act of 1968, as amended, 42 U.S.C. 4001 *et seq.*
- Executive Order 12989 on Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations. February 1994.
- Executive Order 13985 on Advancing Racial Equity and Support for Underserved Communities Through the Federal Government. January 2021.
- Executive Order 14008 on Tackling the Climate Crisis at Home and Abroad. January 2021.
- Executive Order 14030 on Climate-Related Financial Risk. May 2021.

Authority for this plan originates from the following Commonwealth of Pennsylvania sources:

- Pennsylvania Emergency Management Services Code. Title 35, Pa C.S. Section 101.
- Pennsylvania Municipalities Planning Code of 1968, Act 247 as reenacted and amended by Act 170 of 1988.
- Pennsylvania Stormwater Management Act of October 4, 1978. P.L. 864, No. 167.
- Pennsylvania Floodplain Management Act of 1978. P.L. 851, No. 166.
- Pennsylvania Hazardous Material Emergency Planning and Response Act of 1990 (Act 165).

The following FEMA guides and reference documents were used to prepare this document:

- FEMA 386-1: *Getting Started*. September 2002.
- FEMA 386-2: *Understanding Your Risks: Identifying Hazards and Estimating Losses*. August 2001.
- FEMA 386-3: *Developing the Mitigation Plan*. April 2003.
- FEMA 386-4: *Bringing the Plan to Life*. August 2003.
- FEMA 386-5: *Using Benefit-Cost Review in Mitigation Planning*. May 2007.
- FEMA 386-6: *Integrating Historic Property and Cultural Resource Considerations into Hazard Mitigation Planning*. May 2005.

- FEMA 386-7: *Integrating Manmade Hazards into Mitigation Planning*. September 2003.
- FEMA 386-8: *Multijurisdictional Mitigation Planning*. August 2006.
- FEMA 386-9: *Using the Hazard Mitigation Plan to Prepare Successful Mitigation Projects*. August 2008.
- FEMA: Integrating Hazard Mitigation into Local Planning: Case Studies and Tools for Community Officials. March 2013
- FEMA: Mitigation Ideas: A Resource for Reducing Risk to Natural Hazards. January 2013.
- FEMA: National Fire Incident Reporting System 5.0: Complete Reference Guide. January 2015.
- FEMA: Hazard Mitigation Assistance Unified Guidance. February 2015.
- FEMA: *Local Mitigation Planning Handbook.* May 2023.
- FEMA: *Local Mitigation Planning Policy Guide.* April 2022.
- FEMA. *Region 3 High Hazard Potential Dams: Local and Tribal Mitigation Planning Tips*. July 2024.
- FEMA. Rehabilitation of High Hazard Potential Dams (HHPD) Grant Program FAQ. June 2020.

The following Pennsylvania Emergency Management Agency (PEMA) guides and reference documents were used prepare this document:

- PEMA: *Hazard Mitigation Planning Made Easy!*
- PEMA Mitigation Ideas: *Potential Mitigation Measures by Hazard Type; A Mitigation Planning Tool for Communities*. March 2009.
- PEMA. Administrative Processes. December 20, 2019.
- PEMA: *Pennsylvania's Hazard Mitigation Planning Standard Operating Guide*. October 2020.

The following additional guidance document produced by the National Fire Protection Association (NFPA) was used to update this plan:

- NFPA 1600: *Standard on Disaster/Emergency Management and Business Continuity Programs*. 2007.

2. COMMUNITY PROFILE

2.1 GEOGRAPHY AND ENVIRONMENT

Centre County covers approximately 1,115 square miles and is located in the geographic center of the Commonwealth of Pennsylvania. The County is divided diagonally almost equally into two parts, bisected by the Allegheny Front, a feature of the Appalachian Mountain Range which runs from northeast to southwest across eastern and south-central Pennsylvania. The northwestern half of Centre County is comprised of the rugged foothills of the Allegheny Plateau with the southeastern half comprised of prominent ridges and valleys. At its widest point, from Rush Township in the southwest to the very tip of Miles Township in the east, it stretches approximately 67 miles across. The County Seat is the Borough of Bellefonte, centrally located within the Nittany Valley. Figure 2.1-4 illustrates the County's transportation network, water bodies, and municipal boundaries.



Figure 2.1-1: Centre County Courthouse (CCPCDO, 2017)



Figure 2.1-2: Philipsburg Borough, Centre County (CCPCDO, 2017)



Figure 2.1-3: Philipsburg Borough, Centre County (CCPCDO, 2017)

The most significant watercourse is Bald Eagle Creek, which runs diagonally from southwest to northeast through the middle of the County and is a tributary of the West Branch of the Susquehanna River. Other watercourses include Moshannon Creek, also a tributary of the West Branch of the Susquehanna River and western boundary of the County, Penn's Creek which flows eastward into the main branch of the Susquehanna River just south of Sunbury, and Spring Creek which flows north to its confluence with Bald Eagle Creek in Milesburg Borough. Water bodies make up approximately 0.36 percent of the County's geographic area. Figure 2.1-5 shows the watersheds that comprise the County.

Adjacent counties include Clinton County to the north, Union and Mifflin Counties along the east and southeastern border, Huntingdon and Blair Counties to the south, and Clearfield County to the west.

Figure 2.1-4: Centre County Base Map

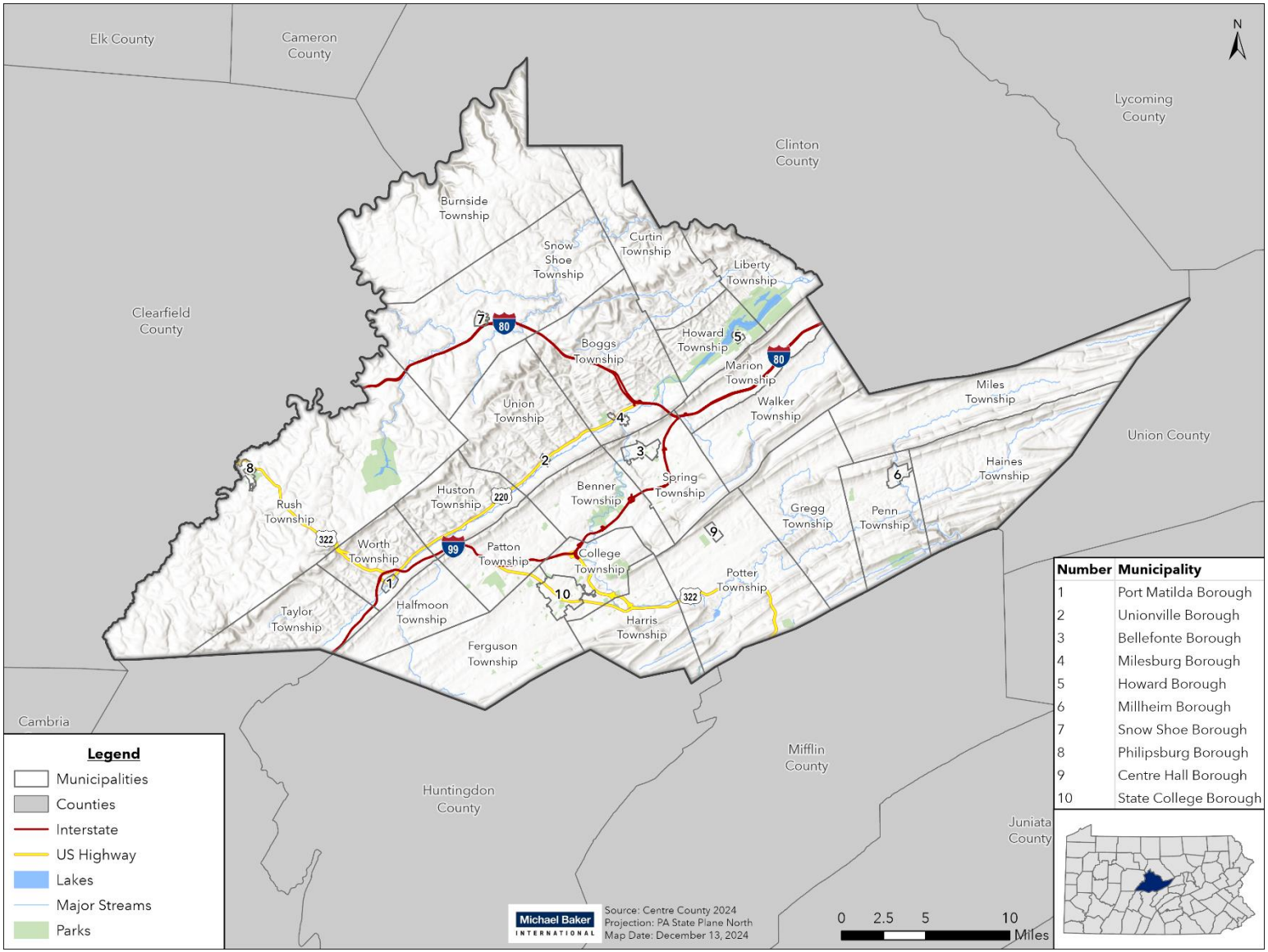
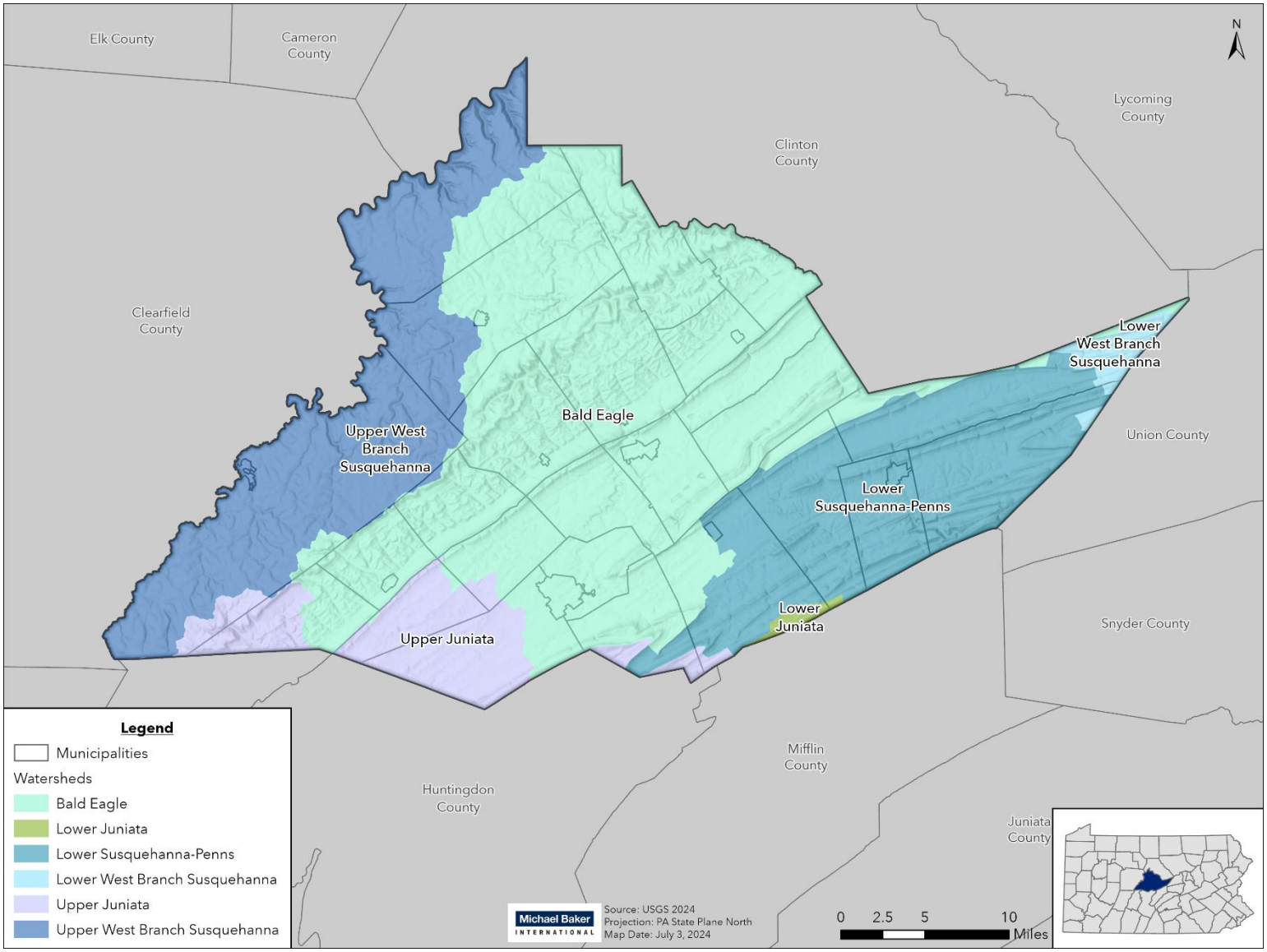


Figure 2.1-5: Centre County Watersheds



2.2 COMMUNITY FACTS

Centre County was formed on February 13, 1800, from parts of Huntingdon, Lycoming, Mifflin, and Northumberland Counties. Throughout history, settlement has concentrated in the eastern half of the County, which possessed abundant natural resources to support a burgeoning iron industry. In fact, Centre County takes its name from the first iron furnace established – Centre Furnace, built in 1791. In 1855, the Farmer's High School of Pennsylvania was established, which would eventually become the Pennsylvania State University (Penn State). Centre Furnace ceased producing iron in 1858, and by the 20th century education became the County's major emphasis.

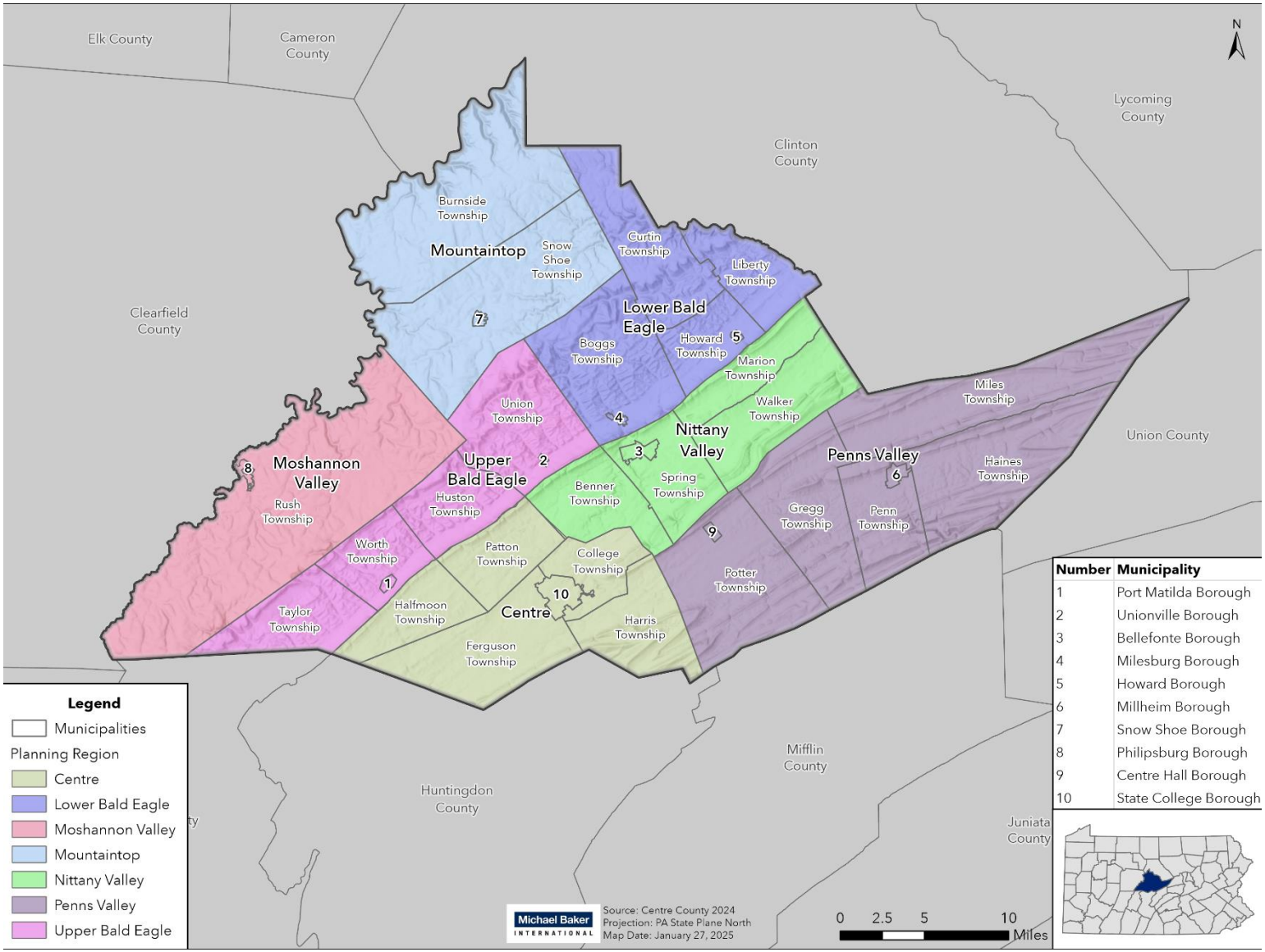
As seen in Table 2.2-1, from 1960 to 2022, Centre County's population more than doubled, but has seen slight decrease in recent years. Centre's population decreased by about 3,000 from 2020 to 2022. Centre County remains a predominantly rural community with 75 percent of the County's land area forested, while another 15 percent is classified as agricultural land use (CCPCDO, 2015). Although the acreage being actively farmed has decreased throughout the years, farming remains an important land use in Centre County. The County has 35 governmental municipalities, 25 townships and 10 boroughs, which are listed in Table 2.3-1.

Table 2.2-1: Centre County Population Change, 1960-2022 (U.S. Census, American Community Survey (ACS))

YEAR	TOTAL POPULATION	PERCENT CHANGE (%)
1960	78,580	-
1970	99,267	26%
1980	112,760	14%
1990	123,786	10%
2000	135,758	10%
2010	153,990	13%
2020	161,443	5%
2022	158,425	-2%
Total		**106%**

The Centre County Planning Commission (CCPC) is comprised of elected officials to represent seven distinct regions of the County (as depicted in Figure 2.2-1 and identified by municipality in Table 2.3-1). Additionally, the Centre County Metropolitan Planning Organization (CCMPO) has responsibility for coordinating transportation planning efforts throughout all of Centre County, including the Centre County Long Range Transportation Plan 2050 (adopted September 2020) and the 2021-2024 Transportation Improvement Program that took effect on October 1, 2020.

Figure 2.2-1: Centre County Planning Regions



The University Park Campus of Penn State University (Penn State) is the only major college located within the County in the Borough of State College. The total enrollment at the University Park Campus in Fall 2023 was 42,223 students. The campus has 6,623 full-time and 7,303 part-time employees (13,926 total employment) (Penn State, 2020a). Additionally, within Centre County there is a vocational and technical training institute and a total of seven public school districts (CCPCDO, 2019a).

Centre County is included in the State College Metropolitan Statistical Area (MSA). There are two major (interstate) highways that traverse the County. I-80 is a major east-west route across the United States, connecting northern New Jersey with California and is a principal route for truck and freight traffic. I-99 connects I-80 in the Nittany Valley of Centre County with the Pennsylvania (PA) Turnpike (I-76) in the vicinity of Bedford, PA. I-99 travels roughly in a north-south direction. In November 2022, the first phase of a project to build a high-speed interchange connection between I-99 and I-80 was completed (RecordStaff, 2022). Phases two and three of the project are expected to begin in summer of 2024 and be completed by 2030 (Rushton, 2024b). Two major US highways include US Route 322, and US 220. Other major state roads include PA Route 26, PA Route 150, PA 144, PA 350, PA 45, and PA 64. This network of roads serves both the major regional traffic movements (freight and major event traffic) and local trips within Centre County. Additionally, the University Park Airport, located in Benner Township and owned by Penn State, provides commercial flights to/from the County. Transportation and land uses are shown on Figure 2.5-1.

It should also be noted that fixed route public transportation is provided by the Centre Area Transportation Authority (CATA). During FY 2022-2023, this system provided trips to 4,762 riders across 92 square miles (PennDOT, 2024). Other services provided by CATA include commuter assistance (vanpool and rideshare services) and demand-response (curb-to-curb) transportation for special needs populations (PennDOT, 2019a). Additionally, the Centre County Office of Transportation also offers a countywide, demand responsive shared-ride service that brings riders door-to-door (CCOT, 2024).

2.3 POPULATION AND DEMOGRAPHICS

The population of Centre County in 2010 was 153,990 (U.S. Census, 2010). The 2022 U.S. Census ACS estimates Centre County's population reached 158,665 people. The County's population is growing faster than surrounding areas, some of which are shrinking, but at a modest rate. Centre County has a young population, with the median age of the County in 2022 estimated at 33.5 years of age. The County also has a high percentage of college-age persons, which may be due to the presence of Penn State

University. Approximately 24.6 percent of the County's population is between the ages of 18 and 24 (U.S. Census Bureau, ACS, 2022).

Population density is highest in and around the State College Borough. Further population growth over the next 30 years is expected to be greatest in the Centre Region, Nittany Valley, and Penns Valley Planning Regions due to their adjacent location to the University. More information on this can be found in Section 4.4.3. Table 2.3-1 provides a distribution of County population by municipality from the 2010 U.S. Census and ACS 2018-2022 five-year estimates. The entirety of the student population may not be accounted for in these estimates as students often identify their permanent address as the residence of their parent or guardian.

Table 2.3-1: Centre County Population by Municipality, 2010-2022 (U.S. Census Bureau, ACS, 2022)

MUNICIPALITY	PLANNING REGION	2010 POP.	2022 POP.	% CHANGE
Bellefonte Borough	Nittany Valley	6,187	6,071	-1.87%
Benner Township	Nittany Valley	6,188	8,662	39.98%
Boggs Township	Lower Bald Eagle Valley	2,985	2,741	-8.17%
Burnside Township	Mountaintop	439	515	17.31%
Centre Hall Borough	Penns Valley	1,265	1,472	16.36%
College Township	Centre	9,521	10,916	14.65%
Curtin Township	Lower Bald Eagle Valley	618	583	-5.66%
Ferguson Township	Centre	17,690	19,015	7.49%
Gregg Township	Penns Valley	2,405	1,976	-17.84%
Haines Township	Penns Valley	1,564	2,021	29.22%
Halfmoon Township	Centre	2,667	2,793	4.72%
Harris Township	Centre	4,873	5,881	20.69%
Howard Borough	Lower Bald Eagle Valley	720	697	-3.19%
Howard Township	Lower Bald Eagle Valley	964	810	-15.98%
Huston Township	Upper Bald Eagle Valley	1,360	1,446	6.32%
Liberty Township	Lower Bald Eagle Valley	2,118	1,809	-14.59%
Marion Township	Nittany Valley	1,224	1,442	17.81%
Miles Township	Penns Valley	1,983	1,772	-10.64%
Milesburg Borough	Penns Valley	1,123	1,148	2.23%
Millheim Borough	Penns Valley	904	598	-33.85%
Patton Township	Centre	15,311	15,749	2.86%
Penn Township	Penns Valley	1,181	1,153	-2.37%
Philipsburg Borough	Moshannon Valley	2,770	2,782	0.43%

Table 2.3-1: Centre County Population by Municipality, 2010-2022 (U.S. Census Bureau, ACS, 2022)

MUNICIPALITY	PLANNING REGION	2010 POP.	2022 POP.	% CHANGE
Port Matilda Borough	Upper Bald Eagle Valley	606	559	-7.76%
Potter Township	Penns Valley	3,517	3,587	1.99%
Rush Township	Moshannon Valley	4,008	3,686	-8.03%
Snow Shoe Borough	Mountaintop	765	714	-6.67%
Snow Shoe Township	Mountaintop	1,746	1,576	-9.74%
Spring Township	Nittany Valley	7,470	7,980	6.83%
State College Borough	Centre	42,034	40,902	-2.69%
Taylor Township	Upper Bald Eagle Valley	853	835	-2.11%
Union Township	Upper Bald Eagle Valley	1,383	1,261	-8.82%
Unionville Borough	Upper Bald Eagle Valley	291	256	-12.03%
Walker Township	Nittany Valley	4,433	4,653	4.96%
Worth Township	Upper Bald Eagle Valley	824	604	-26.70%
Total		**153,990**	**158,665**	**3.04%**

While there was a net increase in the population, Worth Township, Millheim Borough, Howard Township, and Gregg Township are all estimated to have lost more than 15 percent of their population. While these were significant percent losses, all four municipalities have population of less than 3,000 people. Alternatively, Benner Township, Burnside Township, Centre Hall Borough, Harris Township, Haines Township, and Marion Township experienced gains of more than 15 percent. Benner Township gained an estimated 2,474 people. A State Correctional Institution (SCI) was opened in Benner Township in 2013 and houses a population of roughly 2,000 (PA DOC, 2024), accounting for about 75% of the population increase.

It is important to note that the County's non-residential population increases significantly during Penn State Home Football Games. This occurs in and around the vicinity of State College Borough on seven weekends during the fall college football season. While the residential population of State College Borough and adjacent College Township is around 52,000, during Penn State home games as many as 110,000 people crowd into Beaver Stadium. Another significant event in the County is the Central Pennsylvania

Festival of the Arts, usually referred to as "Arts Fest", held in downtown State College Borough every July. The five-day festival draws upwards of 125,000 visitors. The People's Choice Festival has historically occurred at the same time as Arts Fest. It used to be held in Boalsburg, but has been moved to the Centre County Grange Fairgrounds that spans Centre Hall Borough and Potter Township as of 2023. This event also contributes to the large influx of visitors during that week. The Grange Fair is another event that draws a crowd. This 14-day event in August brings approximately 10,000 people to Centre Hall Borough and Potter Township. Many visitors stay in tents and RVs for the fair. Population values used for the State College Borough, College Township, and other surrounding municipalities in the hazard assessments included in this HMP do not directly account for the large volume of people attending these events. However, the potential heightened impact of a hazard event occurring during either a Penn State home football game or Arts Fest on an above normal population is recognized by the County and affected municipalities.



Figure 2.3-1: Central PA Festival of the Arts, State College (CCPCDO, 2017)

In 2022, the median income of households in Centre County was estimated to be $56,008, less than that of the Commonwealth of Pennsylvania as a whole at $71,798 by over $15,000 (U.S. Census Bureau, ACS, 2022). The median age of the County population is 33.5 years with 85.5 percent of the population 18 years of age or older and 16.2 percent 65 years or older. There are approximately 60,457 total housing units in the County, with 63.9 percent classified as single-unit structures, 31.4 percent as multi-unit structures, and 4.7 percent as mobile homes. The median monthly housing costs for mortgaged homeowners is $1,806 and $590 non-mortgaged owners. The median rent is $1,118 per month. In Centre County, 87.5 percent of the population is White, 3.9 percent is Black or African American, and 6.4 percent is Asian; 3.3 percent identifies as Hispanic or Latino (U.S. Census Bureau, ACS, 2022).

Demographic characteristics in Centre County are influenced by the student and faculty population of Penn State University. This is especially true for age, nationality, and income demographics.

2.4 EQUITY IN HAZARD MITIGATION PLANNING

When planning for natural disasters or other hazardous events, accounting for underserved and socially vulnerable communities through an equitable approach is critical for minimizing negative impacts. Underserved communities refers to populations sharing a particular characteristic, as well as geographic communities that have historically been systematically denied a full opportunity to participate in aspects of economic, social and civic life. Social vulnerability is understood as the potential for loss within an individual or social group, recognizing that some characteristics influence an individual's or group's ability to prepare, respond, cope or recover from an event. These characteristics can overlap within populations to create heightened vulnerability, which may be compounded by infrastructure deficiencies within communities and historic or existing discriminatory government policies. Looking at these communities through an equitable approach consists of ensuring the fair and just distribution of resources, opportunities, and support tailored to meet the unique needs of different groups ensuring that everyone has the opportunity to thrive.

Centre County has census tracts that have medium-high challenges or are in the 70th or higher percentile for challenges according to FEMA's Community Resilience Challenges Index (CRCI). The CRCI uses the following 22 indicators:

- Population
  - No High School Diploma
  - Age 65 or older
  - Disabilities
- Household
  - No vehicle
  - Limited English
  - Single Parent Households
  - No Smartphone
- Housing
  - Mobile Home Share
  - Owner-Occupied Housing
- Healthcare
  - Number of Hospitals
  - Medical Professionals per 1,000
  - Population without Insurance
- Economic
  - Unemployment
  - Income Inequality
  - Median Household Income
  - Unemployed Women
  - Population Below Poverty Level
  - Employment in Predominant Sector
- Connection to Community
  - Inactive Voters
  - Civic and Social Organizations
  - No Religious Affiliation
  - Population Change

Figure 2.4-1: FEMA Community Resilience Challenges Index (CRCI) Census Tracts in Centre County (FEMA CRCI, 2024)

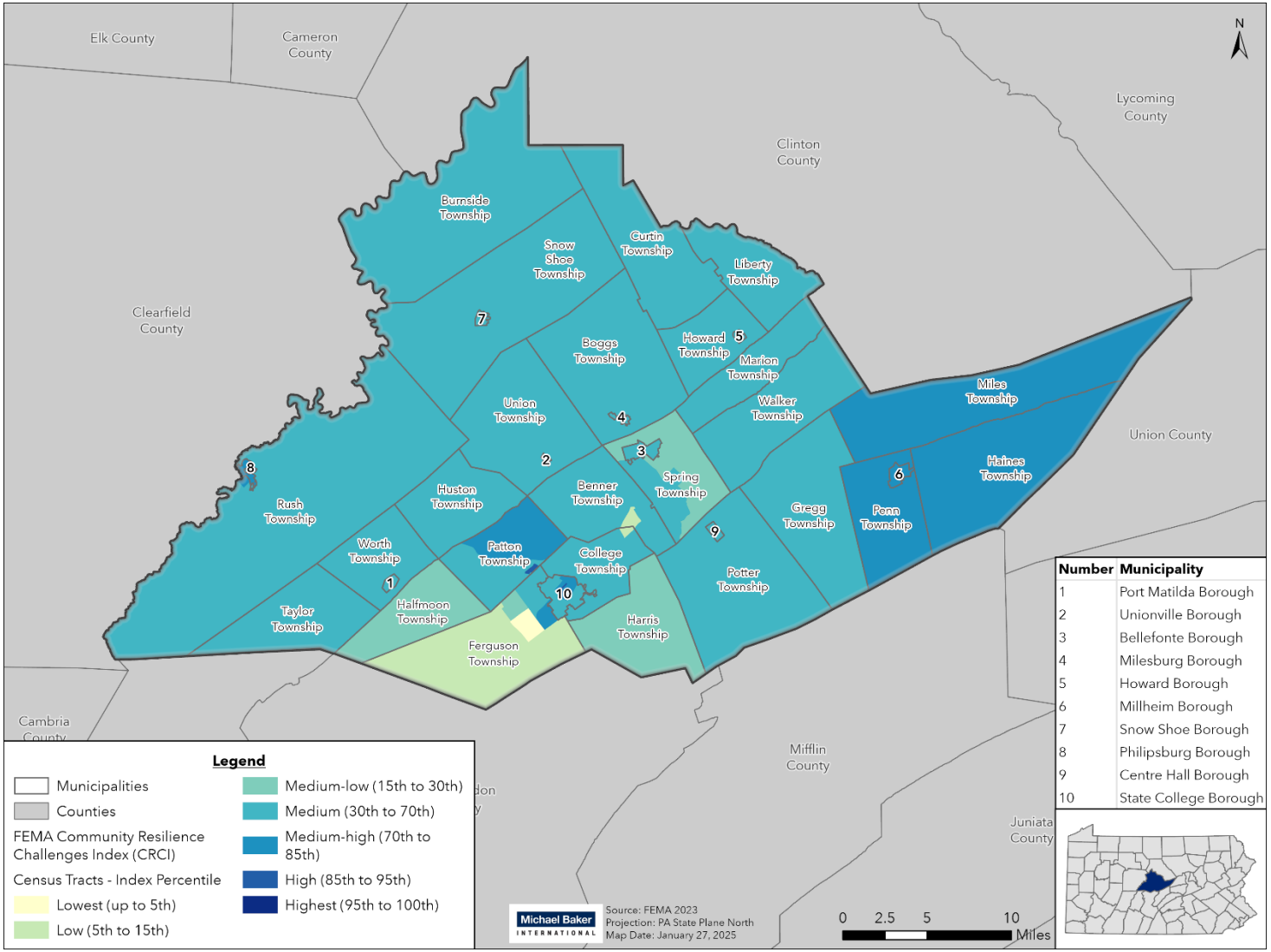


Table 2.4-1: Underserved and Socially Vulnerable Census Tracts in Centre County (FEMA, 2024)

CENSUS TRACT	MUNICIPALITY	CHALLENGE PERCENTILE	INDICATORS
Census Tract 102	Philipsburg Borough	70th – 85th	Population over 65 Years Old, Disabilities, No Vehicle, No Smartphone, Mobile Homes, Owner-Occupied Housing, Number of Hospitals, Medical Professionals, Health Insurance, Median Income, Predominant Sector Employment, Inactive Voters, No Religious Affiliation
Census Tract 108.01	Miles Township	70th – 85th	No High School Diploma, No Vehicle, Limited English, No Smartphone, Mobile Homes, Owner-Occupied Housing, Number of Hospitals, Medical Professionals, Health Insurance, Median Income, Inactive Voters, No Religious Affiliation
Census Tract 108.02	Millheim Borough, Penn Township, Haines Township	70th – 85th	No High School Diploma, No Vehicle, No Smartphone, Mobile Homes, Number of Hospitals, Medical Professionals, Health Insurance, Unemployed Women, Predominant Sector Employment, Inactive Voters, No Religious Affiliation
Census Tract 113.01	Patton Township	85th – 95th	No Vehicle, Owner-Occupied Housing, Number of Hospitals, Medical Professionals, Poverty, Median Income, Unemployment, Predominant Sector Employment, Income Inequality, Inactive Voters, No Religious Affiliation
Census Tract 113.03	Patton Township	70th – 85th	Population over 65 Years Old, No Vehicle, No Smartphone, Owner-Occupied Housing, Number of Hospitals, Unemployment, Predominant Sector Employment, Income Inequality, Inactive Voters, No Religious Affiliation
Census Tract 115.01	Ferguson Township	70th – 85th	Population over 65 Years Old, Limited English, Owner-Occupied Housing, Number of Hospitals, Health Insurance, Unemployment, Predominant Sector Employment, Inactive Voters, No Religious Affiliation
Census Tract 120	State College Borough	70th – 85th	No Vehicle, Owner-Occupied Housing, Number of Hospitals, Poverty, Median Income, Unemployed Women, Predominant Sector Employment, Income Inequality, Inactive Voters, No Religious Affiliation

Table 2.4-1: Underserved and Socially Vulnerable Census Tracts in Centre County (FEMA, 2024)

CENSUS TRACT	MUNICIPALITY	CHALLENGE PERCENTILE	INDICATORS
Census Tract 121	State College Borough	70th – 85th	No High School Diploma, Owner-Occupied Housing, Number of Hospitals, Medical Professionals, Unemployment, Predominant Sector Employment, Inactive Voters, No Religious Affiliation
Census Tract 125	State College Borough	85th – 95th	No Vehicle, Single Parents, Owner-Occupied Housing, Number of Hospitals, Medical Professionals, Poverty, Median Income, Unemployment, Income Inequality, Predominant Sector Employment, Inactive Voters, No Religious Affiliation
Census Tract 126	State College Borough	70th – 85th	No Vehicle, Limited English, Single Parents, Owner-Occupied Housing, Number of Hospitals, Medical Professionals, Poverty, Median Income, Unemployment, Predominant Sector Income, Income Inequality, Inactive Voters, No Religious Affiliation

The map and table show the most vulnerable census tracts, but each census tract in the county has at least one of the 22 indicators in the CRCI. It is important for municipalities to be aware of and understand their vulnerable populations. In each hazard profile, municipalities with communities that may be particularly vulnerable to the hazard's impacts are identified. For example, Patton Township's census tracts in the table above don't include "Limited English" as an indicator, but the township still considers these populations in their operations.

Incorporating equity into mitigation plans ensures that these populations receive the attention and resources necessary to reduce their risk and enhance their resilience. This approach not only addresses existing social inequalities but also leads to more effective and sustainable disaster management outcomes, ensuring that all communities have the opportunity to thrive in the face of adversity.

To adequately target these underserved communities, targeted outreach was a fundamental part of the County's hazard mitigation plan. The plan's outreach plan (Appendix H) discusses the HMSC's work to identify underserved communities using local knowledge and tools. In addition to locating these communities, the HMSC met

with organizations that represent and work with these communities to better understand the services they provide and the populations that utilize them. These organizations work mostly in State College Borough, but have resources and connections in other municipalities to provide assistance to individuals outside the borough. Equity tools published by FEMA simultaneously helped to corroborate findings from the outreach plan.

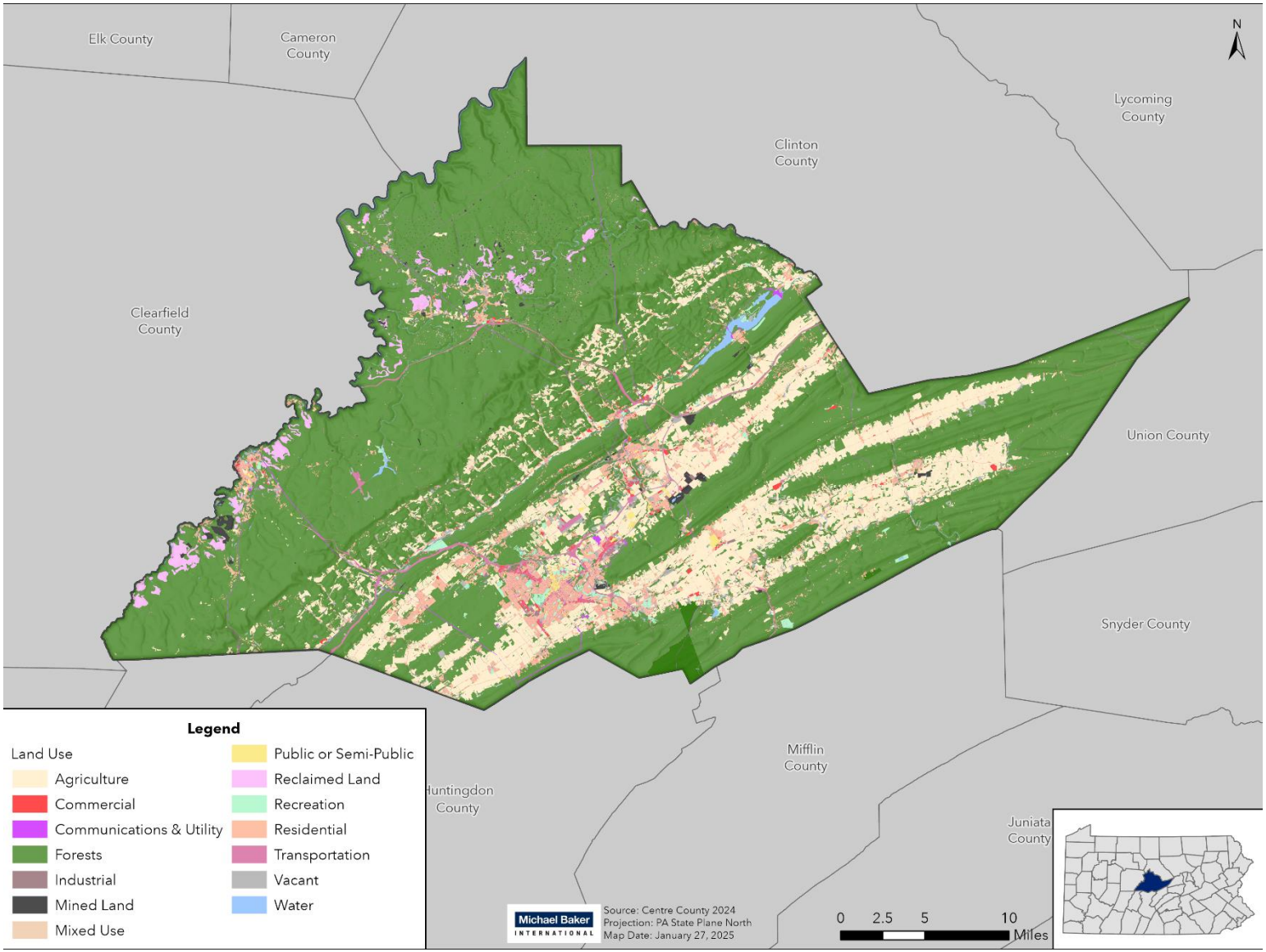
2.5 LAND USE AND DEVELOPMENT

Centre County is predominantly rural in nature, with urban and suburban population densities typically confined to the ten established boroughs within the County as shown in Figure 2.5-1. Villages within Townships also exhibit urban and suburban densities including Pleasant Gap in Spring Township, Lemont in College Township, Pine Grove Mills in Ferguson Township, and Boalsburg in Harris Township. The largest concentration of development is located in the Centre, Penns Valley, and Nittany Valley Planning Regions. Many of the rural areas remaining in the valleys of eastern Centre County are used for agricultural purposes. Ridges and mountainous areas throughout the County limit development potential in these areas, particularly in the western half of Centre County, which remains relatively undeveloped and is dominated by second growth woodlands, state parks, and conservation areas.

County and local land use planning address urban and suburban development as well as farmland protection. The County's Agricultural Security and Agricultural Easement programs are intended to preserve the area's prime natural resources and help maintain a diverse County economy. At present, there are 85,241 acres within the County designated in Agricultural Security Areas. Since 1991, 67 farms totaling 9,351.24 acres have been preserved through easement purchase (CCPCDO, 2023). The County's agricultural preservation activities are coordinated with land use and capital improvement plans.

The highest density of development and concentration of land uses is found in State College Borough and associated with the continued development and expansion of Penn State University. The University Park campus totals approximately 8,556 acres (Penn State, 2020b). The Master Plan for this campus identifies limited opportunities for horizontal expansion of the core campus and emphasizes that future facility expansion would include options for infill and vertical growth, increasing the overall development density. In boundary analysis conducted by the University, horizontal expansion was only deemed possible in an easterly and, to a lesser extent, westerly direction. It was recognized that both the northern and southern edges of the core campus are defined by fixed residential and commercial uses. Additional discussion of future land development is provided in Section 4.4.3 – Future Development and Vulnerability.

Figure 2.5-1: 2024 Centre County Land Use



2.6 DATA SOURCES

The Centre County Geographic Information System (GIS) Office provided many datasets through their open data website: https://gisdata-centrecountygov.opendata.arcgis.com/. These datasets include land use used for analyses throughout the HMP, as well as building points and footprints in the County. The County GIS Office also provided the inventory of parcels and their assessed value, which is not available through their open data site.

The building information did not include attributes beyond the locations of the structures, such as the value of the structure, number of stories, or elevation. In order to effectively evaluate the type of structures vulnerable to individual hazards, the consultant team used a spatial join to assign a land use to each structure using the land use database. Since a spatial join was used to derive land use, if a parcel had more than one structure on it, both were given the same underlying land use. As a result, the counts of structure types used throughout this HMP should be considered estimates. The actual structure and land use may differ than information contained in the database and derived through the land use analysis.

The Centre County GIS Office provided the tax assessment database for use in estimating potential losses. The assessed values were provided for each parcel in Centre County. Structures were assigned to each parcel to determine their assessed value in addition to their land use; if there are multiple structures on a parcel, then the value increased by the number of structures. These estimated values are used solely in the discussion on potential losses, in Section 4.4, with this disclaimer.

For some hazards – flood, environmental hazards, and transportation hazards – the population within the hazardous area was estimated. This was determined by assigning a point to the 2020 U.S. Census population census blocks, and then spatially joining these to the municipalities in Centre County in order to derive these estimations.

Flood hazard data used in this HMP is Centre County's effective flood insurance rate map (FIRM) from 2015, which is the most recent data available. The countywide FIRM was downloaded from the FEMA Map Service Center. This data provides flood frequency and elevation information used in the flood hazard risk assessment.

Additional spatial data was provided by the Pennsylvania Department of Conservation and Natural Resources (DCNR) and the Pennsylvania Department of Transportation (PennDOT). Population and demographic data from the 2020 Decennial Census and 2018-2022 ACS five-year estimates were obtained from the U.S. Census Bureau.

Additional information used to complete the risk assessment for this plan was taken from various government and non-government agency sources. Those sources are cited where appropriate throughout the plan with full references listed in Appendix A - Bibliography. Numerous GIS datasets were obtained from the Pennsylvania Spatial Data Access (PASDA) website (http://www.pasda.psu.edu/). PASDA is the official public access geospatial information clearinghouse for the Commonwealth of Pennsylvania. PASDA was developed by Penn State as a service to the citizens, governments, and businesses of the Commonwealth. PASDA is a cooperative project of the Governor's Office of Administration, Office for Information Technology, Geospatial Technologies Office and the Penn State Institutes of Energy and the Environment of the Pennsylvania State University.

In order to assess the vulnerability of different jurisdictions to the hazards, data on past occurrences of damaging hazard events were gathered. For a number of historic natural-hazard events, the data from the National Centers for Environmental Information (NCEI) (formerly National Climatic Data Center) were utilized. NCEI is part of the U.S. Department of Commerce's National Oceanic and Atmospheric Administration (NOAA). Information on hazard events is compiled by NCEI from data gathered by the National Weather Service (NWS), another division of NOAA. Data used for this plan came from the Storm Events Database, which documents "the occurrence of storms and other significant weather phenomena having sufficient intensity to cause loss of life, injuries, significant property damage, and/or disruption to commerce" (NOAA NCEI, 2024a). The database currently contains hazard event data from January 1950 to August 2024. Other federal datasets came from the United States Geological Service (USGS), the National Hurricane Center, and NOAA's Storm Prediction Center. High Hazard Potential Dam (HHPD) data was collected from Pennsylvania Department of Environmental Protection (PA DEP) and the United States Army Corps of Engineers' (USACE) National Dam Inventory (NDI) and incorporated into the Dam Failure profile (Appendix H). PA DEP provides information from Emergency Action Plans including risk and population vulnerability.

To help document past occurrences of natural and human-made hazards, the Centre County Office of Emergency Services (OES) incident log was reviewed. This log included 450 hazard events from 2021 to September 2024. While this is not a comprehensive database of hazard events that have occurred in Centre County, it provides an inventory of events with which OES has been involved. This data was used to supplement occurrences of natural hazards but was primarily used to identify human-made hazards that generally are not cataloged in a single place. The data is reported the way is appears in the incident log.

Hazus is a powerful risk assessment methodology for analyzing potential losses from floods, hurricane winds, and earthquakes. In Hazus, current scientific and engineering knowledge is coupled with the latest GIS technology to produce estimates of hazard-related damage before or after a disaster occurs. Version 6.1 of this software was used to estimate losses for floods in Luzerne County. For more information about the methodology employed to prepare the Hazus model and estimate losses, see Appendix F.

Throughout the risk and vulnerability assessments included in Section 4 – Risk Assessment, descriptions of data indicate some areas in which the County and municipalities can improve their ability to identify vulnerable structures and improve loss estimates. As the County and municipal governments work to increase their overall technical capacity and implement comprehensive planning goals, they will also attempt to improve the ability to identify areas of increased vulnerability.

The hazard mitigation plan takes assets into consideration. The plan describes the vulnerability of assets to the identified hazards and looks at the risk that makes them susceptible to damage from the identified hazards. Assets considered include:

- People (including underserved communities and socially vulnerable populations).
- Structures (including facilities, lifelines and critical infrastructure).
- Systems (including networks and capabilities).
- Natural, historic, and cultural resources.
- Activities that have value to the community.

Assets were identified in a couple of different ways. One method for asset identification was through looking at FEMA's community lifelines. FEMA community lifelines are essential services that enable the continuous operation of critical government and business functions, which are crucial for human health, safety, and well-being. These lifelines, which are listed in Figure 2.6-1, form the backbone of a community's resilience to disasters. Additionally, Community lifelines will serve as a focal point for assessing vulnerabilities and implementing strategies to minimize disruptions.

Figure 2.6-1: Community Lifelines

 Law Enforcement/ Security, Fire Service, Search and Rescue, Government Service, Community Safety	 Food, Hydration, Shelter, Agriculture	 Medical Care, Public Health, Patient Movement, Medical Supply Chain, Fatality Management	 Power Grid, Fuel
 Infrastructure, Responder Communications, Alerts Warnings and Messages, Finance, 911 and Dispatch	 Highway/Roadway/ Motor Vehicle, Mass Transit, Railway, Aviation, Maritime	 Facilities, HAZMAT, Pollutants, Contaminants	 Potable Water Infrastructure, Wastewater Management

This 2025 HMP Update also evaluates the vulnerability of the County's critical facilities. For the purposes of this plan, critical facilities are those entities that are essential to the health and welfare of the community. Due to the volume of oil and gas wells in the County, the vulnerability of these facilities is analyzed independent of the other critical facilities.

Table 2.6-1 summarizes the critical facilities in Centre County by type and data source. Table 2.6-2 provides a list of critical facility types with definitions. Table 2.6-3 summarizes critical facilities by municipality and type. For a complete listing of critical facilities and their vulnerability to individual hazards, please see Appendix E.

Table 2.6-1: Critical Facilities in Centre County by Type and Data Source

TYPE	NUMBER	DATA SOURCE	TYPE	NUMBER	DATA SOURCE
Airports	10	Centre County 2024	Police Stations	8	Centre County, 2024

Table 2.6-2: Critical Facilities in Centre County by Type and Data Source

TYPE	NUMBER	DATA SOURCE	TYPE	NUMBER	DATA SOURCE
Congregate Care Facilities	21	Centre County, 2024; PA DOH, 2022	Private Schools	35	HIFLD, 2024
Dams	38	PA DEP, 2024	Public Schools	33	HIFLD, 2024
Day Care Centers	110	Centre County, 2024; HIFLD, 2024	Sewer Treatment Plants	26	Centre County, 2024
EMS Stations	15	Centre County, 2024	Shelters	6	Centre County, 2024
Fire Stations	23	Centre County, 2024	Toxic Release Inventory (TRI) Facilities	8	EPA, 2023
Jails	4	Centre County, 2024	Water Treatment Plants	51	Centre County, 2024
Medical Facilities	40	Centre County, 2024	Wells - Conventional	1,417	PA DEP, 2024
Miscellaneous	11	Centre County, 2024	Wells - Unconventional	197	PA DEP, 2024

Table 2.6-2: Types of Critical Facilities in Centre County

TYPE	DEFINITION	WHY IT IS CRITICAL
Airports	A place from which aircraft operate that usually has paved runways and maintenance facilities and often serves as a terminal.	Important for the movement of people and goods and services.
Congregate Care Facilities	A facility licensed by the department or the Department of Human Services, including, but not limited to, a long-term care nursing facility, a skilled nursing facility, an assisted living facility, a personal care home, an independent long-term care facility or an intermediate care facility for individuals with intellectual disabilities.	Provide safety and shelter for vulnerable populations, especially those that require 24/7 care and monitoring.
Dams	A barrier that stops or restricts the flow of surface water or underground streams.	Important infrastructure, providing flood protection, water supply reservoirs, hydroelectric power, and irrigation. Their failure may result in significant damage and loss of life.
Day Care Centers	An institution that provides supervision and care of infants and young children during the daytime.	Necessary for a community's economy by providing employment and for the day-to- day life for many families by providing care for children while parents go to work.
EMS Stations	A facility where emergency medical service (EMS) personnel are stationed or based out of, or where equipment that such personnel use in carrying out their jobs is stored for ready use.	Important for the storage and maintenance of EMS equipment.
Fire Stations	A facility where fire engines and other equipment of a fire department are housed.	Important for the storage and maintenance of firefighting equipment.
Jails	A place for the confinement of people accused or convicted of a crime.	Buildings where many people are present 24/7.

Table 2.6-2: Types of Critical Facilities in Centre County

TYPE	DEFINITION	WHY IT IS CRITICAL
Medical Facilities	A place where sick or injured people are given care or treatment (as a hospital, urgent care center, or a clinic).	Buildings where people may be present 24/7, provide important care services, and may serve as a local shelter.
Miscellaneous	Facilities that do not fit within the other categories on this list, but are important to the communities in the county.	Communities may have assets that are vital to their community that do not fit cleanly into any of the other categories. It is important to assess their risk and consider them in this planning process.
Police Stations	A building which serves to accommodate police officers, other members of police staff, and their equipment.	Important for the storage and maintenance of emergency response equipment.
Private Schools	A school supported by a private organization or private individuals rather than by the government.	Buildings where many people and young vulnerable populations are present during the day, may also serve as a local shelter.
Public Schools	A school supported by public funds.	Buildings where many people and young vulnerable populations are present during the day, may also serve as a local shelter.
Sewer Treatment Plants	A facility that collects and treats wastewater to make it appropriate for a specific end-use.	Provide an essential service that promotes environmental and public health.
Shelters	A place giving temporary protection from bad weather or danger.	Provide physical safety from hazards, including place to sleep, meals, access to clean clothes, and/or medical care or counseling. A place where many people may gather during a hazard event.
Toxic Release Inventory (TRI) Facilities	A facility that stores toxic chemicals listed on the publicly available TRI database that may pose a threat to human health and the environment.	Provide safe storage of chemicals that are harmful to the environment and public health.

Table 2.6-2: Types of Critical Facilities in Centre County

TYPE	DEFINITION	WHY IT IS CRITICAL
Water Treatment Plants	A facility that collects and treats water to make it appropriate for a specific end-use.	Provides water for safe drinking, industrial supply, irrigation, river flow maintenance, and other needs.
Wells - Conventional	A gas or oil well that uses standard drilling methods, such as drilling vertically into rock.	Provide energy resources while also presenting an environmental and public health risk from contamination.
Wells - Unconventional	A gas or oil well that uses technologically advanced drilling methods, such as fracking, to target energy reserves in harder to reach areas.	Provide energy resources while also presenting an environmental and public health risk from contamination.

Table 2.6-3: Critical Facilities by Municipality and Type

MUNICIPALITY	AIRPORT	CONGREGATE CARE	DAM	DAY CARE CENTER	EMS STATION	FIRE STATION	JAIL	MEDICAL FACILITY	MISCELLANEOUS	POLICE STATION	PRIVATE SCHOOL	PUBLIC SCHOOL	SEWER TREATMENT PLANT	SHELTER	TRI	WATER TREATMENT PLANT	WELLS - CONVENTIONAL	WELLS - UNCONVENTIONAL	TOTAL
Bellefonte Borough			1	6	2	2		2	2	2		3				1			21
Benner Township	2		4	8			4	1		1		1			1	4			26
Boggs Township		2		1					1			2	1			1	54		62
Burnside Township			1			1										1	604	87	694
Centre Hall Borough				3		1						1							5
College Township		5	2	11	2	2		11			1	3	1		1	3			42
Curtin Township			1													1	179	7	188
Ferguson Township	1	3	2	13				5		1	4	3			1	1			34

Table 2.6-3: Critical Facilities by Municipality and Type

MUNICIPALITY	AIRPORT	CONGREGATE CARE	DAM	DAY CARE CENTER	EMS STATION	FIRE STATION	JAIL	MEDICAL FACILITY	MISCELLANEOUS	POLICE STATION	PRIVATE SCHOOL	PUBLIC SCHOOL	SEWER TREATMENT PLANT	SHELTER	TRI	WATER TREATMENT PLANT	WELLS - CONVENTIONAL	WELLS - UNCONVENTIONAL	TOTAL
Gregg Township	2	1	2	4	1	1		1			1		1			1			15
Haines Township			2						1		5					2			10
Halfmoon Township				2					1					1		5			9
Harris Township		1	3	1		1		1	2		1					1			11
Howard Borough					1	1						1	3			3			9
Howard Township				2									2			2			6
Huston Township				1									1						2
Liberty Township				3								1	1			1	2		8
Marion Township			2			1					2						1		6
Miles Township					1	1					8	1				2			13
Milesburg Borough		1		3		1			1							1			7
Millheim Borough				1		1													2
Patton Township	2	1	2	5		1		8		1	1	3							24
Penn Township			4	2				1			2	2	3			3			17
Philipsburg Borough			1	6	1	2						2							12
Port Matilda Borough				1	1	1						1							4
Potter Township	1	1	4	1				1			2		3		1	1			15
Rush Township	1	1	4	7	2	1		2					2		1	5	47	13	86
Snow Shoe Borough				1		1						1							3

Table 2.6-3: Critical Facilities by Municipality and Type

MUNICIPALITY	AIRPORT	CONGREGATE CARE	DAM	DAY CARE CENTER	EMS STATION	FIRE STATION	JAIL	MEDICAL FACILITY	MISCELLANEOUS	POLICE STATION	PRIVATE SCHOOL	PUBLIC SCHOOL	SEWER TREATMENT PLANT	SHELTER	TRI	WATER TREATMENT PLANT	WELLS - CONVENTIONAL	WELLS - UNCONVENTIONAL	TOTAL
Snow Shoe Township			2		1								2			1	518	90	614
Spring Township		1		8	1	1		3	2	1	2	2	3	1	3	2			30
State College Borough		4		16	2	1		3		2	4	5	1	4					42
Taylor Township																1	2		3
Union Township	1			2									1			3	7		14
Unionville Borough									1										1
Walker Township				2		2		1			2	1				4			12
Worth Township			1										1			1	3		6
Total	**10**	**21**	**38**	**110**	**15**	**23**	**4**	**40**	**11**	**8**	**35**	**33**	**26**	**6**	**8**	**51**	**1,417**	**197**	**2,053**

3. PLANNING PROCESS

3.1 UPDATE PROCESS AND PARTICIPATION SUMMARY



All 35 municipalities in Centre County met the participation requirements in the 2025 HMP Update process.

The Centre County HMP was originally developed in 2004 by the Centre County OES. The HMP was then updated and adopted for implementation in 2010, 2015 and 2021. The 2004, 2010, 2015, 2021 Plans and this updated 2025 Centre County Plan Update represent the work of many collaborators in developing a blueprint for protecting community assets, preserving the economic viability of the community, and saving lives. The current update to the 2021 Plan was initiated in February 2024. Michael Baker International assisted the County and its municipalities throughout the update process.

This 2025 HMP update was funded by a FEMA grant. The Centre County HMSC, consisting of Centre County OES and CCPCDO staff, was responsible for the development of 2025 HMP Update in partnership with the Hazard Mitigation Planning Team (HMPT) that included representatives from the Centre County municipalities and other local and regional stakeholders. Specifically, the 2025 HMPT included stakeholders from the groups listed in Figure 3.1-1. A full list of stakeholders invited to participate is included in Appendix C – Meeting and Other Participation Documentation. The contact list in Appendix C specifies which stakeholder category (1 through 5 listed in Figure 3.1-1) each contact falls within.

Figure 3.1-1: Centre County HMP Stakeholder Types



All 35 municipalities in Centre County were considered in the vulnerability assessment and the development of the Mitigation Strategy to address vulnerabilities. Details on the members of the HMSC and HMPT are included in Section 3.2 – The Planning Team.

To begin this process, OES and CCPCDO hosted an internal kick-off meeting with the contract support to begin the update process on February 28, 2024. During this meeting, attendees reviewed the Hazard Mitigation Planning process, as well as changes to that process promoted by FEMA's updated Local Mitigation Planning Policy Guide. Additionally, the attendees discussed the scheduling of HMSC, HMPT and public meetings and participation for the 2025 update process. Details on this and other meetings are included in Section 3.3 – Meetings and Documentation.

Detailed information about stakeholder participation is included in Section 3.4 – Public & Stakeholder Participation. The municipal involvement in developing the 2025 HMP Update is detailed in Section 3.5 – Multi-Jurisdictional Planning.

The HMSC used a number of worksheets to gather information from each municipality and participant in the planning process. These worksheets were designed to gather information about the hazards that affected the entire County, and how those hazards affected each of the municipalities, as well as information about the Mitigation Strategy. The use of these forms is detailed in Section 3.3 – Meetings and Documentation and

the submitted forms are included in Appendix C – Meeting and Other Participation Documentation.

To clearly identify and document an approach for the planning process, the Centre County 2025 HMP Update Stakeholder Outreach and Engagement Strategy was developed. This strategy established methods for ongoing opportunities for input, collaboration, and feedback during the HMP update. There are two main sections of the strategy. The Plan Participant Identification section focuses on target audiences, HMSC roles and responsibilities, building the HMPT, public involvement and identifying and including underserved communities. The Outreach and Engagement Methods section focuses on key meetings and touchpoints and leveraging different outreach tools. This strategy can be referenced in Appendix H – Outreach and Engagement Plan.

Figure 3.1-2: Centre County 2025 HMSC Members

Centre County OES	Centre County Planning and Community Development Office	Michael Baker International
Jody Lair *Director of Emergency Services* *County POC*	Ray Stolinas *County Planning Director*	Jessica Bodnar *Project Advisor* *Jessica.Bodnar@mbakerintl.com*
Domer Smeltzer *Deputy Director of Emergency Services*	Liz Lose *Assistant Director*	Devon Benne *Project Manager* *Devon.Benne@mbakerintl.com*
	Elyse Crawford *Planner - Community Planning*	Kyle Dool *Lead Planner* *Kyle.Dool@mbakerintl.com*

The Outreach and Engagement Plan is new to the 2025 planning process and it significantly informed how outreach was approached. The planning team focused a considerable amount of time on implementing the Outreach and Engagement Plan throughout the planning process, including meeting with each community about their risks, discussing how they would like to mitigate those risks, and gaining buy-in for adoption. More details on how the Outreach and Engagement Plan was implemented through the planning process is documented in Section 3.2 – The Planning Team, Section 3.3 – Meetings and Documentation, Section 3.4 – Public & Stakeholder Participation, Section 3.5 – Multi-Jurisdictional Planning and Appendix C – Meeting and Other Participation Documentation.

3.2 THE PLANNING TEAM

The HMPT assembled for the 2025 HMP included representatives from Centre County, the Centre County municipalities, and additional stakeholders representing the groups identified in Figure 3.1-1. The HMSC was assembled to guide the overall direction of the HMP Update and make day-to-day decisions pertaining to its completion in conjunction with the Michael Baker consultant team.

Figure 3.2-1 details the members of the 2025 HMSC. This steering committee follows a similar structure to that established for the 2021 update. The primary roles of the HMSC included providing outreach and coordination among participating jurisdictions, working with communities to identify local risks and vulnerabilities, collecting information on community assets, determining capability updates, and providing technical expertise and mitigation action development. In order to represent the diverse stakeholders in the County, the HMSC developed a list of HMPT members. The stakeholders listed in Table 3.2-1 served on the HMPT and actively participated in the planning process through attendance at meetings, completion of assessment surveys, or submission of comments. Participants representing multiple jurisdictions are listed more than once.

Table 3.2-1: 2025 Centre County HMPT Participants

MUNICIPALITY/ORGANIZATION/ AGENCY	PARTICIPANT(S)
Municipalities	
Bellefonte Borough	Matt Auman, Emergency Management Coordinator; Randy Brachbill, Council Member; Julie Brooks, Borough Administration and Public Works; Deborah Cleeton, Council Member; Dave Lomison, Planning Commission Member and County Director of Transportation; Gina Thompson, HARB, Planning and Zoning Administrator; Joanne Tosti-Vasey, Council Member
Benner Township	Sharon Royer, Secretary
Boggs Township	David Veneziano, Chair, Board of Supervisors
Burnside Township	Connie Holt, Emergency Management Coordinator
Centre Hall Borough	Angela Mundy, Secretary
College Township	Mike Bloom, Assistant Township Manager; Adam Brumbaugh, Township Manager; Jonathan Risley, Centre Region Emergency Management Coordinator
Curtin Township	Lynn Harter, Secretary; Rick Miller, Emergency Management Coordinator

Table 3.2-1: 2025 Centre County HMPT Participants

MUNICIPALITY/ORGANIZATION/ AGENCY	PARTICIPANT(S)
Ferguson Township	Emma Cox, Environmental Sustainability Coordinator; Centrice Martin, Township Manager; Jonathan Risley, Centre Region Emergency Management Coordinator; Kimberly Smith, Director of Planning and Zoning; Jeremie Thompson, Chair, Board of Supervisors
Gregg Township	Donald Albertson, Zoning Hearing Board Member; Jim Smith, Emergency Management Coordinator; Vicky Vanada, Supervisor
Haines Township	Delmer Homan, Emergency Management Coordinator; Mark Hosterman, Township Roadmaster; Daryl Schafer, Chair, Board of Supervisors
Halfmoon Township	Jonathan Risley, Centre Region Emergency Management Coordinator; Amy Smith, Secretary
Harris Township	Mark Boeckel, Township Manager; Jonathan Risley, Centre Region Emergency Management Coordinator; Todd Shea, Zoning Officer
Howard Borough	Zachary Brownson, Emergency Management Coordinator; Nancy Fishburn, Secretary; Autumn Hanley, Council Member; Cody Strouse, Water Maintenance
Howard Township	Matt Ott, Emergency Management Coordinator
Huston Township	Karen Dillon-Ballock, Secretary
Liberty Township	Terry Aument, Secretary/Treasurer/Zoning Officer; Lois Poorman, Zoning Officer; Tami VanHorn, Planning Commission Member
Marion Township	Dave Rosendale, Supervisor; Archie Gettig Jr., Chair, Board of Supervisors
Miles Township	Jennifer Snyder, Secretary/Treasurer; Lisa Kroner, Secretary/Treasurer
Milesburg Borough	Robyn Dyke, Secretary/Treasurer; Federick Kellerman, Council President; Malachi Moyer, Emergency Management Coordinator
Millheim Borough	Scott Long, Emergency Management Coordinator; Robert Zeigler, Council President
Patton Township	Amy Farkas, Township Manager; Jonathan Risley, Centre Region Emergency Management Coordinator
Penn Township	Robert Fox, Chair, Board of Supervisors

Table 3.2-1: 2025 Centre County HMPT Participants

MUNICIPALITY/ORGANIZATION/ AGENCY	PARTICIPANT(S)
Philipsburg Borough	Chris Deck, Emergency Management Coordinator; Ronda Swartz, Code Enforcement Officer; Shelley Walstrom, Secretary
Port Matilda Borough	Ida Lively, Mayor; Mark Lively, Council Member
Potter Township	Scott Floray, Supervisor
Rush Township	David Jackson, Chair, Board of Supervisors; Michelle Merrow, Engineer
Snow Shoe Borough	Lisa McMaster, Secretary/Treasurer; Krista Tobias, Emergency Management Treasurer
Snow Shoe Township	Ron Bucha, Supervisor; Tara Guenot, Secretary; Rodney Preslovich, Chair, Board of Supervisors, John Yecine, Supervisor
Spring Township	Michael Danneker, Township Manager; Jeffrey Kranch, Chair, Planning Commission
State College Borough	Thomas Fountaine, Borough Manager; Jonathan Risley, Centre Region Emergency Management Coordinator; Sam Robbins, Director of Public Works; Marueen Safko, Planner
Taylor Township	Lenny Ellenberger, Chair, Board of Supervisors; Natalie Moore, Secretary; Tim Reese, Supervisor
Union Township	Renee Swancer, Secretary/Treasurer
Unionville Borough	Jason Crestani, Council President; Renee Swancer, Secretary/Treasurer
Walker Township	Zane Sherman, Vice Chair, Board of Supervisors
Worth Township	Jadine Reese, Secretary/Treasurer
Other Stakeholders	
Bald Eagle Area School District	Franie Pollack, Safety and Security Coordinator
Central Pennsylvania Institute of Science and Technology	MaryAnn Volders, Executive Director
Centre County Adult Services	Jeffery Doebler, Assistant Director
Centre County Department of Risk Management	Krista Davis, Chief Risk Officer
Centre County Drug & Alcohol	Karlene Shugars, Program Administrator
Centre County Geographic Information Systems	Nicholas Narger, Director

Table 3.2-1: 2025 Centre County HMPT Participants

MUNICIPALITY/ORGANIZATION/ AGENCY	PARTICIPANT(S)
Centre County Housing Authority	Lori Haines, Executive Director
Centre County Mental Health	Catherine Arbogast, Administrator; Helen DeFilippis, Assistant Administrator
Centre County Metropolitan Planning Organization	Pam Adams, Sustainability Planner; Marcella Hoffman, Grants Specialist; Anne Messner, Senior Transportation Planner; Jame Saylor, Principal Transportation Manager
Centre County Office of Emergency Services	Michaela Bressler, Administrative Assistant; Jody Lair, Director; Domer Smeltzer, Assistant Director
Centre County Planning and Community Development Office	Xochi Confer, Transportation Planner, Elyse Crawford, Planner; Liz Lose, Assistant Director; Ray Stolinas, Director
Centre County Recycling and Refuse Authority	Mimi Cooper, Recycling Coordinator; Regan Hosterman, Operations Manager
Centre County Veterans' Affairs	Brian Querry, Director
Centre Helps	Denise McCann, Executive Director
Centre Region COG	Pam Adams, Sustainability Planner
Centre Region Fire	Shawn Kauffman, Director
Centre Regional Planning Agency	Pam Adams, Sustainability Planner
ClearWater Conservancy	Donnan Stoicovy, Interim Executive Director
FEMA Region 3	Stacey Blankin, Planning Unit Supervisor; Andrew Stone, Planner
Keystone Central School District	Randy Zangara, Assistant Superintendent
North Shore Railroad Company	George Fury, Property Representative; James Mackey, NBER General Manager; Shane Smith, Director of Regulatory Compliance; Justin Wagner, Director of Operations
Out of the Cold	Jordan Veneziano, Executive Director
PA American Water Company	Joshua Dunkle, Source Water Protection Lead
Penns Valley Area School District	Dr. Brian Griffith, Superintendent
Pennsylvania State University	Dan Spencer, Emergency Management Specialist

Table 3.2-1: 2025 Centre County HMPT Participants

MUNICIPALITY/ORGANIZATION/ AGENCY	PARTICIPANT(S)
Pine Glen Fire Company	Croix McCollough, Firefighter; Cole McCollough, Firefighter; Matthew McCollough, Assistant Fire Chief; Peary Schmoke, Fire Chief
SEDA - Council of Governments	Alimara Cassidy, HMP Project Lead; Betsy Kramer, Program Manager for Community Revitalization; Geralee Ziegler, Project Coordinator
SCI Benner Township	Daniel DeCecco
SCI Rockview	Jace Edwards
Snow Shoe Fire Company	Beau Martin, Fire Chief; Dakota Martin, Firefighter; Mike Meiz, Firefighter; Samuel Rees, Firefighter
State College Area School District	Curtis Johnson, Superintendent
State College Regional Airport	Bryan Rodgers, Director

3.3 MEETINGS AND DOCUMENTATION

The following meetings were held during the HMP Update process. Meetings with an asterisk (*) were open to the public. Materials developed and shared for these meetings are included in Appendix C – Meeting and Other Participation Documentation.

February 28, 2024 – HMSC Kick-Off Meeting: This meeting was held virtually and was attended by County representatives and the consultant to go over the planning process and major milestones including the schedule for HMPT meetings and anticipated HMP submission dates. The group also discussed planning requirements, relevant stakeholders, and the availability of geospatial data and other plans and documents for integration.

April 10 and 11, 2024 – HMPT Kick-Off Meetings (one virtual, one hybrid): The virtual meeting was held over lunch time, and the hybrid meeting was held in the evening to accommodate schedules and provide additional opportunity for participation. The meetings included discussion of project scope, schedule, the planning process, participation and engagement, and next steps. Roles and responsibilities, the planning process and community engagement were discussed. Email invitations were sent to each Centre County municipality, as well as other stakeholders spanning the five different types of required stakeholders (see Figure 3.1-1). Meeting attendees were asked to begin completing project forms, check out the project website and provide contact information for other stakeholders that should be included in the planning process.

May 15, 2024 – HMSC Meeting: This meeting was held virtually and was attended by County representatives and the consultant to discuss scheduling the Risk Assessment meetings, developing materials for the Risk Assessment meetings and conducting outreach to non-municipal stakeholders.

July 15, 2024 – HMSC Meeting: This meeting was held virtually and was attended by County representatives and the consultant to discuss finalization logistics for the Risk Assessment meetings, next steps in coordinating outreach to non-municipal stakeholders and scheduling the Mitigation Solutions and Capability Assessment Meetings, as well as the Public Open House.

July through October, 2024 – Risk Assessment Meetings: Meetings were held on a small group basis with participating jurisdictions. Some meetings were held by planning region, and others were held one-on-one with municipalities. These meetings were an opportunity to discuss local hazard risk and vulnerability, and to look at critical facilities and assets. These meetings were leveraged to help jurisdictions meet plan participation requirements. Table 3.3-1 details on the meetings held.

Table 3.3-1: Risk Assessment Meetings

MEETING	DATE	DELIVERY
Nittany Valley Regional Meeting (Bellefonte Borough, Marion Township, Spring Township, Walker Township)	July 18, 2024	In-Person
Penns Valley Regional Meeting (Haines Township, Millheim Borough, Penn Township, Potter Township)	July 23, 2024	In-Person
Mountaintop Regional Meeting (Burnside Township, Snow Shoe Borough, Snow Shoe Township)	July 24, 2024	In-Person
Centre Regional Meeting (College Township, Ferguson Township, Halfmoon Township, Harris Township, Patton Township, State College Borough)	July 20, 2024	Virtual
Liberty Township	8/8/2024	Virtual
Philipsburg Borough	8/8/2024	Virtual
Taylor Township	8/12/2024	Virtual
Gregg Township	8/13/2024	Virtual
Howard Township	8/13/2024	Virtual
Benner Township	8/14/2024	Virtual

Table 3.3-1: Risk Assessment Meetings

MEETING	DATE	DELIVERY
Rush Township	8/15/2024	Virtual
Miles Township	8/19/2024	Virtual
Boggs Township	8/27/2024	Virtual
Huston Township	8/28/2024	Virtual
Milesburg Borough	8/29/2024	Virtual
Curtin Township	9/5/2024	Virtual
Worth Township	9/5/2024	Virtual
Union Township	9/6/2024	Virtual
Unionville Borough	9/6/2024	Virtual
Centre Hall Borough	9/9/2024	Virtual
Unionville Borough	9/10/2024	Virtual
Howard Borough	10/17/2024	In-Person
Port Matilda Borough	No Meeting	N/A

October 15 and 16, 2024 – Mitigation Strategy and Capability Assessment Meetings (one virtual, one in-person): The virtual meeting was held over lunch time, and the in-person meeting was held in the evening to accommodate schedules and provide additional opportunity for participation. These meetings provided a collaborative space for the HMPT to develop the mitigation strategy and review capabilities. They were an opportunity to collectively identify and review relevant plans, policies, and programs already in place. These can be leveraged or built upon in the mitigation strategy. There was also the opportunity to discuss mitigation priorities and identify mitigation actions.



Figure 3.3-1: Open House Flyer

October 17, 2024 – HMSC Meeting: This meeting was held in-person and was attended by County representatives and the consultant to discuss the Capability Assessment and Mitigation Strategy. The Steering Committee talked about what should be included in the Capability Assessment that is new since 2021. They also reviewed the Mitigation

Action Review Form for the County, discussed new actions and discussed updates to the goals.

October 17, 2024 – Public Open House*: An Open House was held in person to provide an opportunity for the public to review information on the plan, ask questions, and provide feedback. Resources were provided that detail the hazard mitigation planning process, information on the current update, the schedule for upcoming Draft Plan Review meetings, and more. A short looping presentation was available for attendees to review, which provided a general overview on the hazard mitigation plan and update process. Members of the HMSC were in attendance to field questions and engage in discussions. The Open House was advertised on the project website, and by conducting outreach to municipalities to post a flyer on their local websites and social media sites. Figure 3.3-1 shows the flyer used to advertise the open house.

November 7, 2024 – Meetings with Organizations that Represent Socially Vulnerable Populations: Individual meetings were held with three organizations that represent socially vulnerable populations in Centre County – Centre Helps, Centre County Office of Veterans Affairs and Out of the Cold. These meetings were an opportunity to discuss the populations and groups these organizations work with and the services that these organizations provide. Input gathered from these meetings will inform the Capability Assessment and Mitigation Strategy.

January 14 and 15, 2025 – Draft Plan Review Public Meetings (two virtual)*: One of the meetings was held over lunch time, and the other was held in the evening to accommodate schedules and provide additional opportunity for participation. The purpose of these final HMPT and public meetings was to provide information about the update process, evaluation, and general findings in the HMP. Additionally, instructions about when and how to review the draft HMP were covered as well as a final timeline for the review and submission to PEMA and FEMA. Invitations were emailed to each municipality and stakeholder on the HMPT. The meeting was noticed on the website, see Figure 3.3-2. Meeting attendees were asked to fill out Plan Comment forms.

January 13, 2025 through February 13, 2025 – Public Review: The draft 2025 HMP Update was posted to the project website on January 13, 2025 so the public could obtain information about the draft, review the HMP, and ask questions or provide comments and feedback. The availability of planning materials and Draft HMP review were advertised on the project website and by conducting outreach to municipalities to post a flyer on their local websites and social media sites. An email was also sent to those who provided their email address when completing the public survey (79 contacts). A question/comment form was available.

3.4 PUBLIC AND STAKEHOLDER PARTICIPATION

Stakeholders and the public were given multiple opportunities to participate in the HMP Update process through invitation to above outlined meetings (the public was invited to meetings with an asterisk (*)), review of risk assessment results and mitigation actions, and an opportunity to comment on a final draft of the 2025 HMP Update. Contacts for all neighboring counties were included on the HMPT contact list. They were delivered email invitations for all HMPT touchpoints and were included in meeting follow-up correspondence. No representatives participated. This outreach is listed in Appendix C – Meeting and Other Participation Documentation. Opportunities open to the public were advertised on the project website, on the county website and through municipal social media accounts. The tools listed below were available on the HMP Update website to solicit information, data, and comments from both local municipalities, other key stakeholders the public in Centre County. These forms were also distributed in-person at the HMPT meetings identified and by email correspondence at different touchpoints throughout the planning process. Responses to these worksheets and surveys are included in Appendix C – Meeting and Other Participation Documentation. Information provided in these forms were also thoroughly incorporated throughout the plan. The sections they informed are outlined in the descriptions below.



Figure 3.3-2: Instagram Post Advertising the Public Survey

- Evaluation of Identified Hazards and Risk Worksheet: Collects information from the Planning Team regarding whether there have been changes to the frequency of occurrence, magnitude of impact, or geographic extent of hazards identified in the 2021 Plan. In addition, the form asks members of the Planning

Team to identify any additional hazards they believe should be considered in the 2025 Plan. This form informed Section 4 – Risk Assessment.

- Jurisdictional Hazard Risk Ranking Form: Collects information on the perceived risk of hazards in each municipality compared to the ranked hazards for the County. Communities list whether the jurisdictional risk is greater, equal to, or less than the County's risk. This form informed Section 4 – Risk Assessment.
- Critical Facilities Review Worksheet: Provides an opportunity for municipalities to review the critical facilities identified in their community. Critical facilities were initially collected from state and national datasets. This worksheet allowed for more local and accurate input. This form informed Section 4 – Risk Assessment, Section 6 – Mitigation Strategy and Appendix E – Critical Facilities.
- Community Lifelines Form: Collects information on the FEMA Community Lifelines in the county. Communities list assets in their community that fall within the different lifeline categories. Section 4 – Risk Assessment, Section 6 – Mitigation Strategy and Appendix E – Critical Facilities.
- Capability Assessment Survey: Collects information on local planning, regulatory, administrative, technical, fiscal, political, and resiliency capabilities that can be included in the plan's Capability Assessment section. This form informed Section 5 – Capability Assessment.
- NFIP Survey: Collects information related to community capabilities towards aspects of the NFIP. This form informed Section 5 – Capability Assessment.
- Mitigation Action Progress Form: This form is specific to each jurisdiction and includes all actions for that jurisdiction in the 2021 HMP. Space is provided to note the current status of each action and to document any progress made. This form informed Section 6 – Mitigation Strategy.
- New Mitigation Action Form: Allows communities to propose new mitigation actions for the HMP Update. This form collects details about the action, including priority, responsible parties, potential funding sources, implementation timeframe, and more. This form informed Section 6 – Mitigation Strategy.
- Plan Comment Form: Provides an opportunity for communities and the public to comment on the plan during the review period.

Community participation and comment was encouraged throughout the planning process, particularly through the project website: https://www.pennsylvaniahmp.com/centre-hmp. This site was created and made publicly available at the beginning of the planning process and acted as a repository

for the entire planning process. The website houses presentations, agendas, minutes, and worksheets from each meeting as well as promulgated meeting dates and important announcements. Since the site was published in February 2024, it has received a total of 750 pageviews. The HMSC also developed a Community Hazard Mitigation Survey intended to solicit public input regarding the understanding of hazard risk, which was posted to the website, and was also shared with communities to post to their social media accounts. See Figure 3.4-1 for an example Instagram post. The survey received over 200 responses (up from 3 responses in 2021). Findings are analyzed in Section 4.4.4 Community Survey.

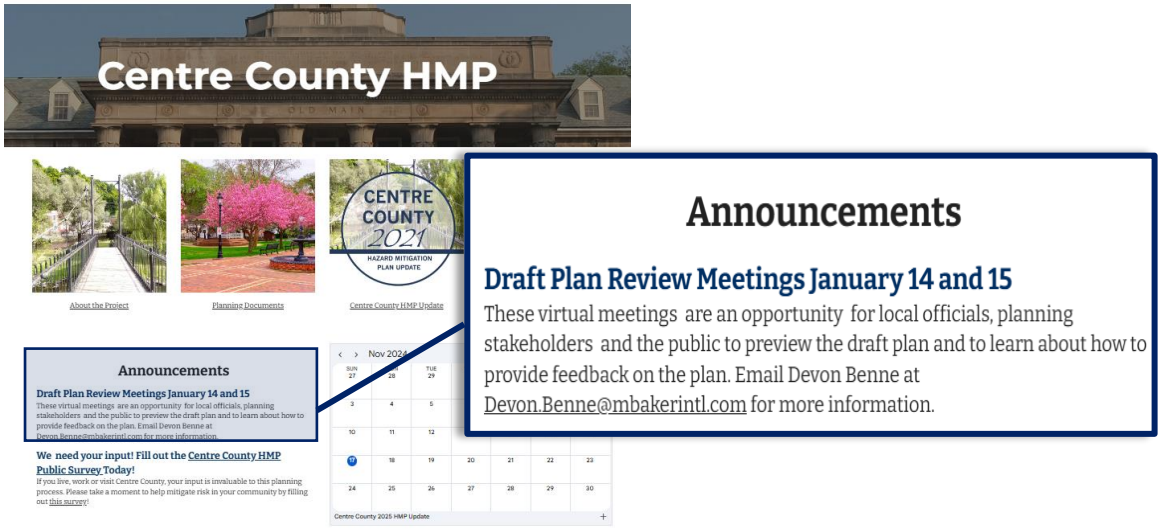
Centre County posted the 2025 draft HMP Update on the project website for review and comment on January 13, 2025 for a 30-day comment period. The invitation to the public to review and comment on the draft plan was posted on the project website and was emailed to local officials with a flyer to share with the public advertising the Draft Plan Review Meetings (Figure 3.4-1). An email was also sent to members of the public who completed the Public Survey and provided their email address in their response (about 85 people).



Figure 3.4-1: Draft Plan Review Meeting Flyer

Comments were to be submitted via the online comment form or in writing to the Centre County OES and/or to Devon Benne of Michael Baker International by mail or email. Copies of all comments received are located in Appendix C – Meeting and Other Participation Documentation.

Figure 3.4-2: Notice of HMP Meetings Posted on the Project Website



3.5 MULTI-JURISDICTIONAL PLANNING

This HMP was developed using a multi-jurisdictional approach. Although County-level departments have resources such as technical expertise and data that local jurisdictions may lack, involvement from local municipalities is critical to the collection of local knowledge related to hazard events. Local municipalities also have the legal authority to enforce compliance with land use planning and development. The HMSC and HMPT was committed to garnering municipal participation. Table 3.5-1 lists jurisdictional participation in this HMP Update. All of the County's 35 municipalities participated in the HMP Update process, achieving 100 percent participation.

HMPT meetings included the Kick-Off Meeting, the Mitigation Strategy and Capability Assessment Workshop and the Draft Plan Review Meeting. The Kick-Off Meeting and Mitigation Strategy and Capability Assessment Workshop were held over the course of two sessions, with both virtual and in-person opportunities. The Draft Plan Review meeting was held over two virtual sessions. All HMPT meetings had afternoon and evening meeting sessions to maximize participation. Stakeholders were emailed invitations and reminders to all meetings. Surveys and forms were provided at meetings, posted to the project website, or emailed or mailed to jurisdictions. There was also targeted outreach to municipalities through the Risk Assessment Meetings. The Risk Assessment Meetings were held with small groups of municipalities or one-on-one with municipalities. Targeted outreach to each individual community via emails and phone calls was conducted. Forms and materials were shared with municipalities prior to and after each meeting. There were also conversations with stakeholders involved throughout the process about adopting the plan as a special district. At this time, no stakeholders would like to adopt as a special district.

Table 3.5-1: 2025 Centre County Stakeholder Participation

	COUNTY HMP MEETINGS						WORKSHEETS AND EXERCISES								
	PLAN KICK-OFF MEETINGS	RISK ASSESSMENT MEETINGS	MITIGATION AND CAPABILITY WORKSHOPS	OPEN HOUSE	SOCIALLY VULNERABLE POPULATIONS MEETINGS	DRAFT PLAN REVIEW MEETINGS	EVALUATION OF IDENTIFIED HAZARDS AND RISK WORKSHEET	RISK RANKING EVALUATION	CRITICAL FACILITIES FORM	COMMUNITY LIFELINES FORM	CAPABILITY ASSESSMENT SURVEY	NFIP COMPLIANCE AND CAPABILITIES SURVEY	MITIGATION ACTION PROGRESS FORM	NEW MITIGATION ACTION FORM	PLAN COMMENT
Municipalities															
Bellefonte Borough	X	X	X			X	X	X	X	X	X		X		
Benner Township	X	X	X			X	X	X	X	X	X	X	X		
Boggs Township		X	X			X	X	X	X	X	X	X	X		
Burnside Township		X	X				X	X		X					
Centre Hall Borough		X					X	X		X					
College Township	X	X	X			X	X	X	X	X	X	X			
Curtin Township	X	X					X	X		X					
Ferguson Township	X	X	X			X	X	X	X	X	X	X	X		
Gregg Township		X				X			X		X	X	X	X	
Haines Township	X	X					X	X	X	X					
Halfmoon Township	X	X	X			X	X	X	X	X	X	X			
Harris Township	X	X	X			X	X	X	X	X	X	X			
Howard Borough		X					X	X	X	X	X		X	X	
Howard Township		X				X	X								
Huston Township		X						X		X			X		
Liberty Township		X					X	X		X	X	X			

Table 3.5-1: 2025 Centre County Stakeholder Participation

	COUNTY HMP MEETINGS						WORKSHEETS AND EXERCISES								
	PLAN KICK-OFF MEETINGS	RISK ASSESSMENT MEETINGS	MITIGATION AND CAPABILITY WORKSHOPS	OPEN HOUSE	SOCIALLY VULNERABLE POPULATIONS MEETINGS	DRAFT PLAN REVIEW MEETINGS	EVALUATION OF IDENTIFIED HAZARDS AND RISK WORKSHEET	RISK RANKING EVALUATION	CRITICAL FACILITIES FORM	COMMUNITY LIFELINES FORM	CAPABILITY ASSESSMENT SURVEY	NFIP COMPLIANCE AND CAPABILITIES SURVEY	MITIGATION ACTION PROGRESS FORM	NEW MITIGATION ACTION FORM	PLAN COMMENT
Marion Township		X	X				X	X	X	X	X				
Miles Township		X					X	X	X	X			X		
Milesburg Borough		X					X	X	X	X					
Millheim Borough	X	X				X	X	X	X	X	X		X	X	
Patton Township	X	X	X			X	X	X	X	X	X	X	X		
Penn Township		X					X	X	X	X					
Philipsburg Borough	X	X					X	X	X	X					
Port Matilda Borough	X						X	X		X	X		X		
Potter Township		X					X	X	X	X					
Rush Township	X	X					X	X	X	X	X				
Snow Shoe Borough		X					X		X	X					
Snow Shoe Township	X	X					X	X		X					
Spring Township	X	X				X	X	X			X	X			
State College Borough	X	X	X	X		X	X	X	X	X	X				
Taylor Township		X					X	X	X	X					
Union Township		X					X	X	X	X					
Unionville Borough		X					X	X	X	X					

Table 3.5-1: 2025 Centre County Stakeholder Participation

	COUNTY HMP MEETINGS						WORKSHEETS AND EXERCISES								
	PLAN KICK-OFF MEETINGS	RISK ASSESSMENT MEETINGS	MITIGATION AND CAPABILITY WORKSHOPS	OPEN HOUSE	SOCIALLY VULNERABLE POPULATIONS MEETINGS	DRAFT PLAN REVIEW MEETINGS	EVALUATION OF IDENTIFIED HAZARDS AND RISK WORKSHEET	RISK RANKING EVALUATION	CRITICAL FACILITIES FORM	COMMUNITY LIFELINES FORM	CAPABILITY ASSESSMENT SURVEY	NFIP COMPLIANCE AND CAPABILITIES SURVEY	MITIGATION ACTION PROGRESS FORM	NEW MITIGATION ACTION FORM	PLAN COMMENT
Walker Township		X					X	X							
Worth Township							X	X	X	X					
Other Stakeholders															
Bald Eagle Area School District	X														
Central Pennsylvania Institute of Science and Technology	X										X				
Centre County Adult Services	X														
Centre County Department of Risk Management	X														
Centre County Drug & Alcohol	X														
Centre County Geographic Information Systems	X		X												
Centre County Housing Authority						X									
Centre County Mental Health	X														
Centre County Metropolitan Planning Organization	X	X	X			X	X	X		X	X			X	

Table 3.5-1: 2025 Centre County Stakeholder Participation

	COUNTY HMP MEETINGS						WORKSHEETS AND EXERCISES								
	PLAN KICK-OFF MEETINGS	RISK ASSESSMENT MEETINGS	MITIGATION AND CAPABILITY WORKSHOPS	OPEN HOUSE	SOCIALLY VULNERABLE POPULATIONS MEETINGS	DRAFT PLAN REVIEW MEETINGS	EVALUATION OF IDENTIFIED HAZARDS AND RISK WORKSHEET	RISK RANKING EVALUATION	CRITICAL FACILITIES FORM	COMMUNITY LIFELINES FORM	CAPABILITY ASSESSMENT SURVEY	NFIP COMPLIANCE AND CAPABILITIES SURVEY	MITIGATION ACTION PROGRESS FORM	NEW MITIGATION ACTION FORM	PLAN COMMENT
Centre County Office of Emergency Services	X	X	X	X		X							X	X	
Centre County Planning and Community Development Office	X	X	X	X		X							X		
Centre County Recycling and Refuse Authority	X		X			X									
Centre County Veterans' Affairs	X				X										
Centre Helps					X	X	X								
Centre Region COG											X				
Centre Region Fire	X														
Centre Regional Planning Agency	X	X					X								
ClearWater Conservancy	X														
FEMA Region 3	X		X												
Keystone Central School District	X										X				

Table 3.5-1: 2025 Centre County Stakeholder Participation

	COUNTY HMP MEETINGS						WORKSHEETS AND EXERCISES								
	PLAN KICK-OFF MEETINGS	RISK ASSESSMENT MEETINGS	MITIGATION AND CAPABILITY WORKSHOPS	OPEN HOUSE	SOCIALLY VULNERABLE POPULATIONS MEETINGS	DRAFT PLAN REVIEW MEETINGS	EVALUATION OF IDENTIFIED HAZARDS AND RISK WORKSHEET	RISK RANKING EVALUATION	CRITICAL FACILITIES FORM	COMMUNITY LIFELINES FORM	CAPABILITY ASSESSMENT SURVEY	NFIP COMPLIANCE AND CAPABILITIES SURVEY	MITIGATION ACTION PROGRESS FORM	NEW MITIGATION ACTION FORM	PLAN COMMENT
North Shore Railroad Company	X														
Out of the Cold					X										
PA American Water Company	X														
Penns Valley Area School District	X		X												
Pennsylvania State University	X					X	X	X			X		X		
Pine Glen Fire Company															
SEDA - Council of Governments	X		X												
SCI Benner Township				X											
SCI Rockview				X											
Snow Shoe Fire Company															
State College Regional Airport						X									

4. RISK ASSESSMENT

4.1 UPDATE PROCESS SUMMARY

This Risk Assessment provides a factual basis for activities proposed by the County in their Mitigation Strategy. Hazards that may affect Centre County are identified and defined in terms of location and geographic extent, magnitude of impact, previous events, and the likelihood of future occurrence. Wherever data could be validated, information from the previous plan has been incorporated and/or updated in the 2025 HMP. In addition, new data sources and analysis have been incorporated throughout the Risk Assessment.

The 2004 Centre County HMP included a list of eight natural and seven human-made hazards affecting the County. In the 2010 HMP, the HMSC added 4 hazards: Extreme Temperature, Lighting Strike, Pandemic, and Earthquake. For the 2015 HMP, the HMSC added Oil and Gas Extraction to Environmental Hazards and added Radon Exposure as an additional hazard. In addition, both the 2010 and 2015 Plans re-arranged the hazard profiles to be compliant with the Commonwealth of Pennsylvania's Standard Operating Guide.

For the 2021 Plan Update, the HMSC reviewed the updated Pennsylvania Standard List of Hazards for consideration in the updated Risk Assessment. Following this review, two hazards identified for inclusion in the Plan Update: Cyber Terrorism and Opioid Addiction. The decision was based on recent occurrences of these types of events in the County and throughout the Commonwealth. Additionally, per PEMA's updated 2020 SOG, the Environmental Hazards profiled in the 2015 Plan were separated into three distinct profiles.

For the 2025 Plan Update, the HMSC reviewed the previously identified hazards and ensured that they remained relevant hazards. The HMSC also reviewed the 2023 State Hazard Mitigation Plan and, for consistency, updated "Opioid Addiction" to "Substance Use Disorder" and updated "Transportation Accidents" to "Transportation Incidents". Based on input from stakeholders, the HMSC also decided to include two new hazards – Environmental Hazard – Coal Mining and Environmental Hazard – Gas and Liquid Pipelines. Table 4.1-1 provides the list of the hazards identified and included in the 2025 HMP, and the year they were first identified for inclusion.

Table 4.1-1: Natural and Human-Made Hazards by Year Identified for Inclusion in Centre County HMP

HAZARD	YEAR	HAZARD	YEAR
Civil Disturbance	2004	Lighting Strike	2010
Cyber Terrorism	2021	Nuclear Incident	2004
Dam Failure	2004	Pandemic and Infectious Disease	2010
Drought	2004	Radon Exposure	2015
Earthquake	2010	Subsidence, Sinkhole	2004
Environmental Hazards – Coal Mining	2025	Substance Use Disorder*	2021
Environmental Hazards – Gas and Liquid Pipelines	2025	Terrorism	2004
Environmental Hazards - Hazardous Materials Release	2004	Tornado, Windstorm	2004
Environmental Hazards - Conventional Oil & Gas Wells	2015	Transportation Incidents*	2004
Environmental Hazards - Unconventional Oil & Gas Wells	2015	Urban Fire and Explosion	2004
Extreme Temperature	2010	Utility Interruption	2004
Flood, Flash Flood, Ice Jam	2004	Wildfire	2004
Hurricane, Tropical Storm, Nor'easter	2004	Winter Storms	2004
Landslide	2004		

*Hazard names updated for the 2025 Plan.

After the HMSC identified the hazards, they developed risk profiles in order to define the characteristics of the hazard as it applies to Centre County. Following hazard identification and profiling, a vulnerability assessment was performed to identify the impact of natural or human-made hazard events on people, buildings, infrastructure, and the community. Each natural and human-made hazard is discussed in terms of its potential impact on individual communities in Centre County, including the types of structures, infrastructure, populations, and other assets that may be at risk. The assessment allows the County and its municipalities to focus mitigation efforts on areas most likely to be damaged or to require early response to a hazard event. A vulnerability analysis was performed which identifies community assets that may be impacted by hazard events and describes what those events can do to physical, social and economic assets. Depending upon data availability, assessment results may consist of an inventory of vulnerable structures or populations.

Each hazard profile has an "Equity in Vulnerable Communities" section, which expands on how certain socioeconomic factors can result in hazards having a disproportionate impact on certain populations or communities. This assessment allows the County and its municipalities to focus mitigation and preparedness efforts more adequately by allocating resources more fairly, improving emergency responses, and enhancing overall community resilience. Each hazard profiles also identifies community lifelines that may be affected by the associated natural hazards. The community lifelines are listed in Figure 2.6-1. Appendix E – Critical Facilities and Community Lifelines also includes insights from the Community Lifelines Forms that were completed by communities. The appendix includes a table for each lifeline listing the assets that were identified as being a part of each lifeline per municipality.

4.2 HAZARD IDENTIFICATION

4.2.1 Table of Presidential Disaster Declarations

Under the Stafford Act, there are two forms of presidential action that authorize federal disaster assistance dollars. Presidential Emergency Declarations are intended to spur activities that will protect property and strengthen public safety to lessen impacts or avoid a catastrophic event. Presidential Disaster Declarations are made as a result of a disaster event and provide supplemental coordination and financial assistance beyond the ability of state and local governments (McCarthy, 2011). Because of the difference in these declarations, a single event may qualify for both kinds of declarations.

There is no financial threshold for an Emergency Declaration, but there are two thresholds for Presidential Disaster Declarations established under the Stafford Act: a state and a county threshold. These thresholds are based on a formula that uses the population of the jurisdiction (as recorded in the decennial Census) times a set per capita indicator. For federal fiscal year 2021, these thresholds are $4.60 per capita for counties and $1.84 per capita for the state. With a population of over 158,000, the Centre County threshold is over $700 thousand dollars. State and county thresholds must be simultaneously attained for a Presidential Disaster Declaration to be issued (FEMA, 2024f).

Table 4.2-1 identifies Presidential Disaster and Emergency Declarations that have affected Centre County.

Table 4.2-1: Presidential Disaster and Emergency Declarations affecting Centre County (FEMA, 2024d)

DECLARATION NUMBER	DATE	EVENT
4618	September 2021	Hurricane Ida
4506	March 2020	COVID-19 Pandemic
3441*	March 2020	COVID-19 Pandemic

Table 4.2-1: Presidential Disaster and Emergency Declarations affecting Centre County (FEMA, 2024d)

DECLARATION NUMBER	DATE	EVENT
4292	December 2016	Severe Storms, Flooding
4149	October 2013	Severe Storms, Tornadoes, Flooding
3356*	October 2012	Hurricane Sandy
3340*	August 2011	Flooding; Remnants of Tropical Storm Lee
3235*	September 2005	Hurricane Katrina Evacuee Assistance
1557	September 2004	Tropical Depression Ivan
1555	September 2004	Severe Storms and Flooding associated with Tropical Depression Frances
1093	January 1996	Flooding
1085	January 1996	Severe Winter Storm
1015	January 1994	Severe Winter Storm
3105*	March 1993	Severe Winter Storm
485	September 1975	Hurricane Eloise
340	June 1972	Hurricane Agnes

** Presidential Emergency Declaration*

Since 1955, declarations have been issued for various hazard events including hurricanes or tropical storms, severe summer and winter storms, flooding and drought. A unique Presidential Emergency Declaration was issued in September 2005. Through Emergency Declaration 3235, President George W. Bush declared that a state of emergency existed in the Commonwealth of Pennsylvania and ordered federal aid to supplement Commonwealth and local response efforts to help people evacuated from their homes due to Hurricane Katrina. All counties within the Commonwealth, including Centre County, were indirectly affected by Hurricane Katrina as a result of evacuee assistance. The COVID-19 Pandemic was another unique declaration as it applied to the entire country. More information on the impacts of this event can be found in Section 4.3.9.

4.2.2 Summary of Hazards

Following a review of the hazards evaluated in the 2004, 2010, 2015 and 2021 HMPs and the Pennsylvania Standard List of Hazards, the HMSC along with input from the HMPT decided that the 2025 Plan should identify, profile, and analyze 27 hazards. These 27 hazards include all hazards profiled in the 2021 Plan with the addition of two new hazards: Environmental Hazard – Coal Mining and Environmental Hazard – Gas and Liquid Pipelines.

Table 4.2-2 contains a complete list of the 27 hazards that have the potential to impact Centre County as identified through previous Risk Assessments, the County Hazards Vulnerability Analysis, and input from those that participated in the 2025 HMP Update. Hazard profiles are included in Section 4.3 for each of these hazards.

Table 4.2-2: Descriptions of Natural and Human-Made Hazard Profiled in the 2025 HMP Update (PEMA, 2020)

PROFILED HAZARD	HAZARD DESCRIPTION
Natural	
Drought	Drought is defined as a deficiency of precipitation experienced over an extended period of time, usually a season or more. Droughts increase the risk of other hazards, like wildfires, flash floods, and landslides or debris flows. This hazard is of particular concern in Pennsylvania due to the prevalence of farms and other water-dependent industries, water-dependent recreation uses, and residents who depend on wells for drinking water.
Earthquake	An earthquake is the motion or trembling of the ground produced by sudden displacement of rock usually within the upper 10-20 miles of the Earth's crust. Earthquakes result from crustal strain, volcanism, landslides, or the collapse of underground caverns. Earthquakes can affect hundreds of thousands of square miles, cause damage to property measured in the tens of billions of dollars, result in loss of life and injury to hundreds of thousands of persons, and disrupt the social and economic functioning of the affected area.
Extreme Temperature	Extreme heat often results in the highest number of annual deaths of all weather-related hazards. In most of the United States, extreme heat is defined as a long period (2 to 3 days) of high heat and humidity with temperatures above 90 degrees. (Ready.gov, 2018). Extremely cold air comes every winter in at least part of the country and affects millions of people across the United States. The arctic air, together with brisk winds, can lead to dangerously cold wind chill values. People exposed to extreme cold are susceptible to frostbite and hypothermia in a matter of minutes.

Table 4.2-2: Descriptions of Natural and Human-Made Hazard Profiled in the 2025 HMP Update (PEMA, 2020)

PROFILED HAZARD	HAZARD DESCRIPTION
Flood, Flash Flood, Ice Jam	Flooding is the temporary condition of partial or complete inundation of normally dry land, and it is the most frequent and costly of all natural hazards in Pennsylvania. Flash flooding is usually a result of heavy localized precipitation falling in a short time period over a given location, often along mountain streams and in urban areas where much of the ground is covered by impervious surfaces. Winter flooding can include ice jams which occur when warm temperatures and heavy rain cause snow to melt rapidly. Snow melt combined with heavy rains can cause frozen rivers to swell, which breaks the ice layer on top of a river. The ice layer often breaks into large chunks, which float downstream, piling up in narrow passages and near other obstructions such as bridges and dams.
Hurricane, Tropical Storm, Nor'easter	Hurricanes, tropical storms, and nor'easters are classified as cyclones and are any closed circulation developing around a low-pressure center in which the winds rotate counterclockwise (in the Northern Hemisphere) and whose diameter averages 10-30 miles across. Potential threats from hurricanes include powerful winds, heavy rainfall, storm surges, coastal and inland flooding, rip currents, tornadoes, and landslides. The Atlantic hurricane season runs from June 1 to November 30.
Landslide	In a landslide, masses of rock, earth or debris move down a slope. Landslides can be caused by a variety of factors, including earthquakes, storms, fire, and human modification of land. Areas that are prone to landslide hazards include previous landslide areas, areas on or at the base of slopes, areas in or at the base of drainage hollows, developed hillsides with leach field septic systems, and areas recently burned by forest or brush fires.
Lightning Strike	Lightning is a giant spark of electricity resulting from the build-up of positive and negative charges within a thunderstorm. The flash or "bolt" of light can occur within the thunderstorm cloud or between the cloud and the ground. Lightning is a leading cause of injury and death from weather-related hazards. Although most lightning victims survive, people struck by lightning often report a variety of long-term, debilitating symptoms.
Pandemic and Infectious Disease	A pandemic is a global outbreak of disease that occurs when a new virus emerges in the human population, spreading easily in a sustained manner, and causing serious illness. An epidemic describes a smaller-scale infectious outbreak, within a region or population, that emerges at a disproportional rate. Infectious disease outbreaks may be widely dispersed geographically, impact large numbers of the population, and could arrive in waves lasting several months at a time.

Table 4.2-2: Descriptions of Natural and Human-Made Hazard Profiled in the 2025 HMP Update (PEMA, 2020)

PROFILED HAZARD	HAZARD DESCRIPTION
Radon Exposure	Radon is a radioactive gas produced by the breakdown of uranium in soil and rock that can lead to lung cancer in people exposed over a long period of time. Most exposure comes from breathing in radon gas that enters homes and buildings through foundation cracks and other openings. According to the DEP, approximately 40% of Pennsylvania homes have elevated radon levels.
Subsidence, Sinkhole	Land subsidence is a gradual settling or sudden sinking of the ground surface due to the movement of subsurface materials. A sinkhole is a subsidence feature resulting from the sinking of surficial material into a pre-existing subsurface void. Subsidence and sinkholes are geologic hazards that can impact roadways and buildings and disrupt utility services. Subsidence and sinkholes are most common in areas underlain by limestone and can be exacerbated by human activities such as water, natural gas, and oil extraction.
Tornado, Windstorm	A tornado is a narrow, violently rotating column of air that extends from the base of a thunderstorm to the ground. About 1,250 tornadoes hit the United States each year, with about 16 hitting Pennsylvania. Damaging winds exceeding 50-60 miles per hour can occur during tornadoes, severe thunderstorms, winter storms, or coastal storms. These winds can have severe impacts on buildings, pulling off the roof covering, roof deck, or wall siding and pushing or pulling off the windows.
Wildfire	A wildfire is an unplanned fire that burns in a natural area. Wildfires can cause injuries or death and can ruin homes in their path. Wildfires can be caused by humans or lightning, and can happen anytime, though the risk increases in period of little rain. In Pennsylvania, 98% of wildfires are caused by people.
Winter Storm	A winter storm is a storm in which the main types of precipitation are snow, sleet, or freezing rain. A winter storm can range from a moderate snowfall or ice event over a period of a few hours to blizzard conditions with wind-driven snow that lasts for several days. Most deaths from winter storms are not directly related to the storm itself, but result from traffic accidents on icy roads, medical emergencies while shoveling snow, or hypothermia from prolonged exposure to cold.
Human-made	
Civil Disturbance	A civil disturbance is defined by FEMA as a civil unrest activity (such as a demonstration, riot, or strike) that disrupts a community and requires intervention to maintain public safety.

Table 4.2-2: Descriptions of Natural and Human-Made Hazard Profiled in the 2025 HMP Update (PEMA, 2020)

PROFILED HAZARD	HAZARD DESCRIPTION
Cyber Terrorism	Cyber terrorism refers to acts of terrorism committed using computers, networks, and the Internet. The most widely cited definition comes from Denning's Testimony before the Special Oversight Panel on Terrorism: "Cyberterrorism…is generally understood to mean unlawful attacks and threats of attack against computers, networks, and the information stored therein when done to intimidate or coerce a government or its people in furtherance of political or social objectives. Further, to qualify as cyberterrorism, an attack should result in violence against persons or property, or at least cause enough harm to generate fear."
Dam Failure	Dam failure is the uncontrolled release of water (and any associated wastes) from a dam. This hazard often results from a combination of natural and human causes, and can follow other hazards such as hurricanes, earthquakes, and landslides. The consequences of dam failures can include property and environmental damage and loss of life.
Environmental Hazards – Coal Mining	Major impacts from coal mining include subsidence, landscape changes, and the chemical degradation of surface and subsurface waters. In addition, active and abandoned mines can result in injury and loss of human life. In active mines, workers can be injured or killed by mine collapse, entrapment, poisonous gases, inundation, explosions, fires, equipment malfunction, or improper ventilation. In abandoned mines, causes of injury or death include falling and drowning.
Environmental Hazards- Gas and Liquid Pipelines	Pipeline failures are low-probability, potentially high-consequence events. Although gas and liquid pipeline failures are infrequent, the hazardous and inflammable materials released by these events can pose a significant threat to public safety and the built and natural environment. Explosions associated with pipeline failures, for example, can cause severe injury to nearby residents and destroy homes and other property.
Environmental Hazards - Hazardous Materials Release	Hazardous material releases can contaminate air, water, and soils and have the potential to cause injury or death. Dispersion can take place rapidly when transported by water and wind. While often accidental, releases can occur as a result of human carelessness, intentional acts, or natural hazards. When caused by natural hazards, these incidents are known as secondary events.

Table 4.2-2: Descriptions of Natural and Human-Made Hazard Profiled in the 2025 HMP Update (PEMA, 2020)

PROFILED HAZARD	HAZARD DESCRIPTION
Environmental Hazards - Conventional Oil & Gas Wells	Many of the hazards associated with conventional oil and gas extraction relate to the contamination of surface and subsurface waters. Abandoned oil and gas wells that are not properly plugged can contaminate groundwater and pollute domestic drinking water wells. In addition, surface waters and soil can be contaminated by brine, a salty wastewater product of oil and gas well drilling, or by oil spills. This pollution can degrade public drinking water supplies and disrupt aquatic ecosystems.
Environmental Hazards - Unconventional Oil & Gas Wells	In addition to the hazards associated with conventional oil and gas extraction, potential hazards from Marcellus Shale gas wells include surface water depletion affecting drinking water supplies and aquatic ecosystems; contaminated surface and groundwater resulting from hydraulic fracturing and the recovery of contaminated hydraulic fracturing fluid; and mishandling of solid toxic waste.
Nuclear Incident	Nuclear explosions can cause significant damage and casualties from blast, heat, and radiation. The primary concern following a nuclear accident or nuclear attack is the extent of radiation, inhalation, and ingestion of radioactive isotopes which can cause acute health effects (e.g. death, burns, severe impairment), chronic health effects (e.g. cancer), and psychological effects.
Substance Use Disorder	Substance Use Disorder occurs when an individual becomes physically dependent on opioids, which include opiates and narcotics. Opioids are a synthetic substance found in certain prescription pain medications: morphine, codeine, methadone, oxycodone, hydrocodone, fentanyl, and hydromorphone, and street drugs like heroine. Opioids block the body's ability to feel pain and can create a sense of euphoria. Individuals often build a tolerance to opioid drugs, which leads them to take more of the medication than originally prescribed.
Terrorism	Terrorism is use of force or violence against persons or property with the intent to intimidate or coerce. Acts of terrorism include threats of terrorism; assassinations; kidnappings; hijackings; bomb scares and bombings; cyber-attacks (computer-based); and the use of chemical, biological, nuclear and radiological weapons. Cyber-attacks have become an increasingly pressing concern.
Transportation Incidents	Transportation incidents are technological hazards involving the nation's system of land, sea, and air transportation infrastructure. A flaw or breakdown in any component of this system can and often does result in a major disaster involving loss of life, injuries, property and environmental damage, and economic consequences.

Table 4.2-2: Descriptions of Natural and Human-Made Hazard Profiled in the 2025 HMP Update (PEMA, 2020)

PROFILED HAZARD	HAZARD DESCRIPTION
Urban Fire and Explosion	Urban fire and explosion hazards include vehicle and building/structure fires as well as overpressure rupture, overheat, or other explosions that do not ignite. This hazard occurs in denser, more urbanized areas statewide and most often occurs in residential structures. Nationally, fires cause over 3,000 deaths and approximately 16,000 injuries each year.
Utility Interruption	Utility interruption hazards are hazards that impair the functioning of important utilities in the energy, telecommunications, public works, and information network sectors. Utility interruption hazards include the following: • Geomagnetic Storms • Fuel or Resource Shortage • Electromagnetic Pulse • Information Technology Failure • Ancillary Support Equipment • Public Works Failure • Telecommunications System Failure • Transmission Facility or Linear Utility Accident • Major Energy, Power, Utility Failure

4.3 HAZARD PROFILES

NATURAL HAZARDS

4.3.1 Drought



Drought is a natural climatic condition which occurs in virtually all climates, the consequence of a natural reduction in the amount of precipitation experienced over a long period of time, usually a season or more in length. High temperatures, prolonged winds, and low relative humidity can exacerbate the severity of drought. This hazard is of particular concern in Pennsylvania due to the presence of farms as well as water-dependent industries and recreation areas across the Commonwealth. A prolonged drought could severely impact these sectors of the local economy, as well as residents who depend on wells for drinking water and other personal uses (NDMC, 2020).

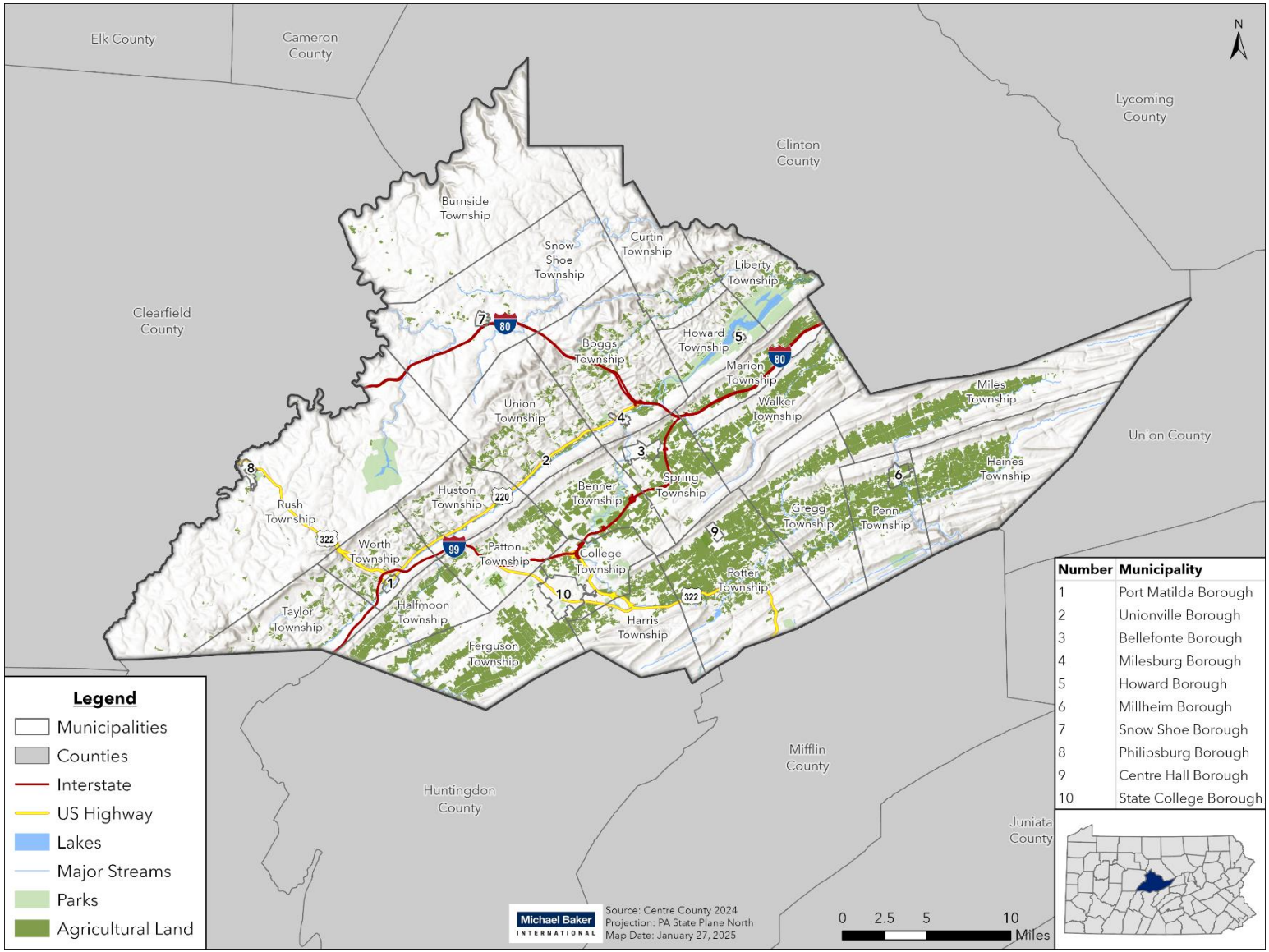
There are two types of droughts that Centre County is concerned with; hydrologic and water management (as categorized by the World Meteorological Organization). A hydrologic drought is defined in terms of reduction of stream flows, reduction in lake or reservoir storage and lowering of groundwater levels. This results from a shift in normal weather patterns over an area causing the amount of precipitation to fall significantly below the long-termed average. A water management drought is characterized as water deficiencies that exist due to failure of water management practices or facilities to bridge normal or abnormal dry periods and equalized water supply throughout the year. Pennsylvania has faced and will continue to face both types of droughts.

4.3.1.1 Location and Extent

Droughts are regional climatic events, so when these events occur in Centre County, impacts are felt across the entire county as well as areas outside county boundaries. The spatial extent for areas of impact can range from central Pennsylvania to the entire mid-Atlantic region. Locations of droughts nationwide are monitored continuously by USGS, and the PA DEP monitors conditions throughout the Pennsylvania. Maps showing locations currently experiencing drought conditions are posted on various websites (including http://waterwatch.usgs.gov) and show locations where stream flow is below normal and where drought conditions exist or are emerging. As this plan was being developed between February 2024 and May 2025, Centre County experienced a period of normal drought status (PA DEP, 2024b).

Areas with extensive agricultural land use can experience particularly significant impacts. As shown in Figure 4.3.1-1, these areas are concentrated in the central and southeastern parts of Centre County.

Figure 4.3.1-1: Centre County Agricultural Land Use, 2024



4.3.1.2 Range of Magnitude

Droughts can have varying effects, depending on the month in which they occur, as well as the severity, duration, and location of the event. Even short-term droughts can be devastating, especially in conjunction with extreme temperatures.

Hydrologic drought events result in a reduction of stream flows, reduction of lake/reservoir storage, and a lowering of groundwater levels. These events have adverse impacts on public water supplies for human consumption, rural water supplies for livestock consumption and agricultural operations, water quality, natural soil water or irrigation water for agriculture, soil moisture, conditions conducive to wildfire events, and water for navigation and recreation.

The Commonwealth uses five parameters to assess drought conditions:

1. Stream flows (compared to benchmark records)
2. Precipitation (measured as the departure from normal, 30-year average precipitation)
3. Reservoir storage levels in a variety of locations (especially three New York City reservoirs in upper Delaware River Basin)
4. Groundwater elevations in a number of counties (comparing to past month, past year and historic record)
5. The Palmer Drought Severity Index (PSDI)– a soil moisture algorithm calibrated for relatively homogeneous regions which measures dryness based on recent precipitation and temperature (see Table 4.3.1-1)

Table 4.3.1-1: Palmer Drought Severity Index (PSDI) Classifications (NOAA, 2024a)

Severity Category	PSDI Value
Extremely wet	4.0 or more
Very wet	3.0 to 3.9
Moderately wet	2.0 to 2.99
Slightly wet	1.0 to 1.99
Incipient wet spell	0.5 to 0.99
Near normal	0.49 to -0.49
Incipient dry spell	-0.5 to -0.99
Mild drought	-1.0 to -1.99
Moderate drought	-2.0 to -2.99
Severe drought	-3.0 to -3.99
Extreme drought	-4.0 or less

Data provided by Cornell University show that drought conditions in the Central Mountains region of Pennsylvania have resulted in PDSI level as low as -6.4. This was

during a drought that lasted for 10 months from 1930 through 1931. In the Centre County area, the average PDSI level for droughts is -3.9 and the average duration of a drought is 3.4 months (Northeast Regional Climate Center, 2024).

In Pennsylvania, PEMA has primary responsibility for managing droughts with direct support from the DEP. According to Drought Management in Pennsylvania (2012), PEMA and DEP use the following three stages to describe and manage droughts. They are listed below in order of increasing severity:

- Drought Watch: A period to alert government agencies, public water suppliers, water users and the public regarding the potential for future drought-related problems. The focus is on increased monitoring, awareness and preparation for response if conditions worsen. A request for voluntary water conservation is made. The objective of voluntary water conservation measures during a drought watch is to reduce water uses by 5 percent in the affected areas. Due to varying conditions, individual water suppliers or municipalities may be asking for more stringent conservation actions.
- Drought Warning: This phase involves a coordinated response to imminent drought conditions and potential water supply shortages through concerted voluntary conservation measures to avoid or reduce shortages, relieve stressed sources, develop new sources, and if possible, forestall the need to impose mandatory water use restrictions. The objective of voluntary water conservation measures during a drought warning is to reduce overall water uses by 10-15 percent in the affected areas. Due to varying conditions, individual water suppliers or municipalities may be asking for more stringent conservation actions.
- Drought Emergency: This stage is a phase of concerted management operations to marshal all available resources to respond to actual emergency conditions, to avoid depletion of water sources, to assure at least minimum water supplies to protect public health and safety, to support essential and high priority water uses and to avoid unnecessary economic dislocations. It is possible during this phase to impose mandatory restrictions on non-essential water uses that are provided in the Pennsylvania Code (Chapter 119), if deemed necessary and if ordered by the Governor of Pennsylvania. The objective of water use restrictions (mandatory or voluntary) and other conservation measures during this phase is to reduce consumptive water use in the affected area by fifteen percent, and to reduce total use to the extent necessary to preserve public water system supplies, to avoid or

mitigate local or area shortages and to assure equitable sharing of limited supplies.

- Local Water Rationing: Although not a drought phase, local municipalities may, with the approval of the PA Emergency Management Council, implement local water rationing to share a rapidly dwindling or severely depleted water supply in designated water supply service areas. These individual water rationing plans, authorized through provisions of the Pennsylvania Code (Chapter 120), will require specific limits on individual water consumption to achieve significant reductions in use. Under both mandatory restrictions imposed by the Commonwealth and local water rationing, procedures are provided for granting of variances to consider individual hardships and economic dislocations.

Environmental impacts of drought include:

- Hydrologic effects – lower water levels in reservoirs, lakes and ponds; reduced stream flow; loss of wetlands; estuarine impacts; groundwater depletion and land subsidence; effects on water quality such as increases in salt concentration and water temperature.
- Damage to animal species – lack of feed and drinking water; disease; loss of biodiversity; migration or concentration; and reduction and degradation of fish and wildlife habitat.
- Damage to plant communities – loss of biodiversity; loss of trees from urban landscapes and wooded conservation areas.
- Increased number and severity of fires.
- Reduced soil quality.
- Air quality effects – dust and pollutants.
- Loss of quality in landscape.
- Loss of water for navigation and recreation.
- Increase in nitrate levels which can have health impacts on pregnant women and children.

The drought of 2002 typifies drought impacts across Centre County's agricultural community and could be considered a worst-case drought event for the County. Data from the Pennsylvania Agricultural Statistics Service indicated that crop yields were down almost 30 percent for corn and soybeans. The diminished ability to produce feed corn for cattle also impacted dairy farmers that year. The reduced acreage farmers use, often diminished due to development pressures, impacted their resiliency to this drought event and economic hardships were endured. In response to drought

conditions, the HMSC reported that the County did not have difficulty in compliance with the voluntary five-percent reductions in non-essential water use that are established during persistent drought events.

The potential impacts of drought on community lifelines are as follows:

Table 4.3.1-2: Most Likely Lifelines Impacted by Drought

LIFELINES	NOTES
	Drought will require significant personnel in response; some in recovery and mitigation.
	Crops may be lost and there are water regulation concerns.
	Food and water shortages could exacerbate health challenges, especially for food-vulnerable populations.

4.3.1.3 Past Occurrence

Declared drought status for Centre County from November 1980 to March 2024 is shown in Table 4.3.1-2. Descriptions for drought status categories (i.e. watch, warning, and emergency) are included in Section 4.3.1.2. Between 1930 and 2024, the Commonwealth of Pennsylvania experienced seven significant droughts extending from 1930-1934, 1939-1942, 1953-1955, 1961-1967, 1980-1983, 1991-1992 and 1999-2003. These were considered emergency events. The 1980-1983 event resulted in $196,000,000 in damages to crops across the Commonwealth. Below average rainfall created shortages in a number of municipalities in 1988, 1989, 1991, 1995, 1998, and early 1999. Table 4.3.1-2 provides further detail on the significant droughts from 1980 through 2024.

In the past, during times of below average rainfall some communities experienced problems with water supply, but in most cases, voluntary rationing worked as a temporary solution to the problem. During “drought watch” events, a voluntary five percent reduction in water usage is enacted. During state declared drought emergencies, mandatory restrictions have been put into effect, as occurred during the 1991, 1995, and 1999 droughts. Due to the high cost of meeting the surface water requirements of the Safe Drinking Water Act reauthorization enacted in 1986, most communities have developed adequate ground water sources and no longer

experience water deficiencies during periods of below average rainfall. For example, the State College area resolved water supply problems by developing additional ground water sources that continue to exceed the need for the foreseeable future.

Table 4.3.1-3: Centre County Declared Drought Status from 1980 to 2024 (PA DEP, 2024a)

DATE	DROUGHT STATUS	DATE	DROUGHT STATUS
Nov 18, 1980 - Apr 20, 1982	Emergency	Dec 5, 2001 - Feb 12, 2002	Watch
Apr 26, 1985 - Jul 29, 1985	Watch	Feb 12, 2002 - May 13, 2002	Watch
Jul 29, 1985 - Oct 22, 1985	Watch	May 13, 2002 - Jun 14, 2002	Watch
Oct 22, 1985 - Oct 29, 1985	Emergency	Sep 5, 2002 - Nov 7, 2002	Watch
Oct 29, 1985 - Dec 19, 1985	Emergency	Apr 11, 2006 - Jun 30, 2006	Watch
Jul 7, 1988 - Aug 24, 1988	Watch	Aug 8, 2007 - Sep 5, 2007	Watch
Aug 24, 1988 - Dec 12, 1988	Warning	Sep 5,2007 – Oct 5, 2007	Watch
Mar 3, 1989 – May 15, 1989	Watch	Oct 5, 2007 – Jan 11, 2008	Watch
Jun 28, 1991 - Jul 24, 1991	Warning	Jan 11, 2008 - Feb 15, 2008	Watch
Jul 24, 1991 - Aug 16, 1991	Emergency	Dec 19, 2002 – Jan 8, 2003	Watch
Aug 16, 1991 - Sep 13, 1991	Emergency	Jan 8, 2003 – Jun 18, 2003	Watch
Sep 13, 1991 - Oct 21, 1991	Emergency	Apr 11, 2006 – Jun 30, 2006	Watch
Oct 21, 1991 - Jan 16, 1992	Emergency	Aug 6, 2007 – Sept 5, 2007	Watch
Jan 17, 1992 - Apr 20, 1992	Emergency	Sept 5, 2007 – Oct 5, 2007	Watch
Apr 20, 1992 - Jun 23, 1992	Warning	Oct 5, 2007 – Jan 11, 2008	Warning
Sep 1, 1995 - Sep 20, 1995	Warning	Jan 11, 2008 – Feb 15, 2008	Watch
Sep 20, 1995 - Nov 8, 1995	Emergency	Nov 7, 2008 – Jan 26, 2009	Watch
Nov 8, 1995 - Dec 18, 1995	Warning	Sept 16, 2010 - Nov 10 2010	Watch
Jul 17, 1997 - Oct 27, 1997	Watch	Aug 5, 2011 - Sept 2, 2011	Watch
Oct 27, 1997 - Nov 13, 1997	Watch	June 17, 2015 – July 10, 2015	Watch
Dec 3, 1998 - Dec 8, 1998	Warning	Aug 2, 2016 – Sep 6, 2016	Watch
Dec 8, 1998 - Dec 14, 1998	Warning	Sep 6, 2016 – Nov 3, 2016	Watch
Dec 14, 1998 - Dec 16, 1998	Warning	Nov 3, 2016 – Dec 16, 2016	Watch
Dec 16, 1998 - Jan 15, 1999	Warning	Dec 16, 2016 – Feb 14, 2017	Watch
Jan 15, 1999 - Mar 15, 1999	Warning	Feb 14, 2017 – Apr 6, 2017	Watch
Mar 15, 1999 - Jun 10, 1999	Watch	Apr 6, 2017 – May 16, 2017	Watch
Jun 10, 1999 - Jun 18, 1999	Warning `	Aug 21, 2020 – Sept 2, 2020	Watch
Jun 18, 1999 - July 20, 1999	Warning	Sept 10, 2020 – Sept 30, 2020	Warning

Table 4.3.1-3: Centre County Declared Drought Status from 1980 to 2024 (PA DEP, 2024a)

DATE	DROUGHT STATUS	DATE	DROUGHT STATUS
Jul 20, 1999 - Sep 30,1999	Emergency	Sept 30, 2020 – Oct 28, 2020	Warning
Sep 30, 1999 - Dec 16, 1999	Warning	Oct 28, 2020 – Nov 17, 2020	Warning
Dec 16, 1999 - Feb 25, 2000	Warning	Nov 17, 2020 – Jan 7, 2021	Warning
Feb 25, 2000 - May 5, 2000	Watch	Jan 7, 2021 – Feb 4, 2021	Watch
Aug 8, 2001 - Aug 24, 2001	Watch	Aug 31, 2022 – Oct 17, 2022	Watch
Aug 24, 2001 - Nov 6, 2001	Watch	Oct 17, 2022 – Dec 8, 2022	Watch
Nov 6, 2001 - Dec 5, 2001	Watch	Dec 8, 2022 – Jan 20, 2023	Watch
Dec 5, 2001 – Feb 12, 2002	Warning	Jun 15, 2023 – Aug 24, 2023	Watch
Feb 12, 2002 – May 13, 2002	Emergency	Aug 24, 2023 – Sept 22, 2023	Watch
May 13, 2002 – Jun 14, 2002	Emergency	Dept 22, 2023 – Oct 20, 2023	Warning
Jun 14, 2002 – Aug 9, 2002	Emergency	Oct 20, 2023 – Dec 1, 2023	Warning
Aug 9, 2002 – Sept 5, 2002	Emergency	Dec 1, 2023 – Dec 22, 2023	Warning
Sept 5, 2002 – Nov 7, 2002	Emergency	Dec 22, 2023 – Jan 26, 2024	Warning
Nov 7, 2002 – Dec 19, 2002	Emergency	Jan 26, 2024 – Mar 6, 2024	Warning

According to the PA DEP's Watershed Management Drought Information Center, the County has had 23 drought watches and 10 drought warnings in the period since the last drought emergency that ended in December of 2002. As shown in Table 4.3.1-2, Centre County has not had a declared drought warning or emergency since Winter 2024; however, some of the agricultural lands have experienced loss due to drought conditions, such as in 2002. Since the 2020 Plan Update, there have been 7 drought watches and 9 drought warnings (PA DEP, 2024a).

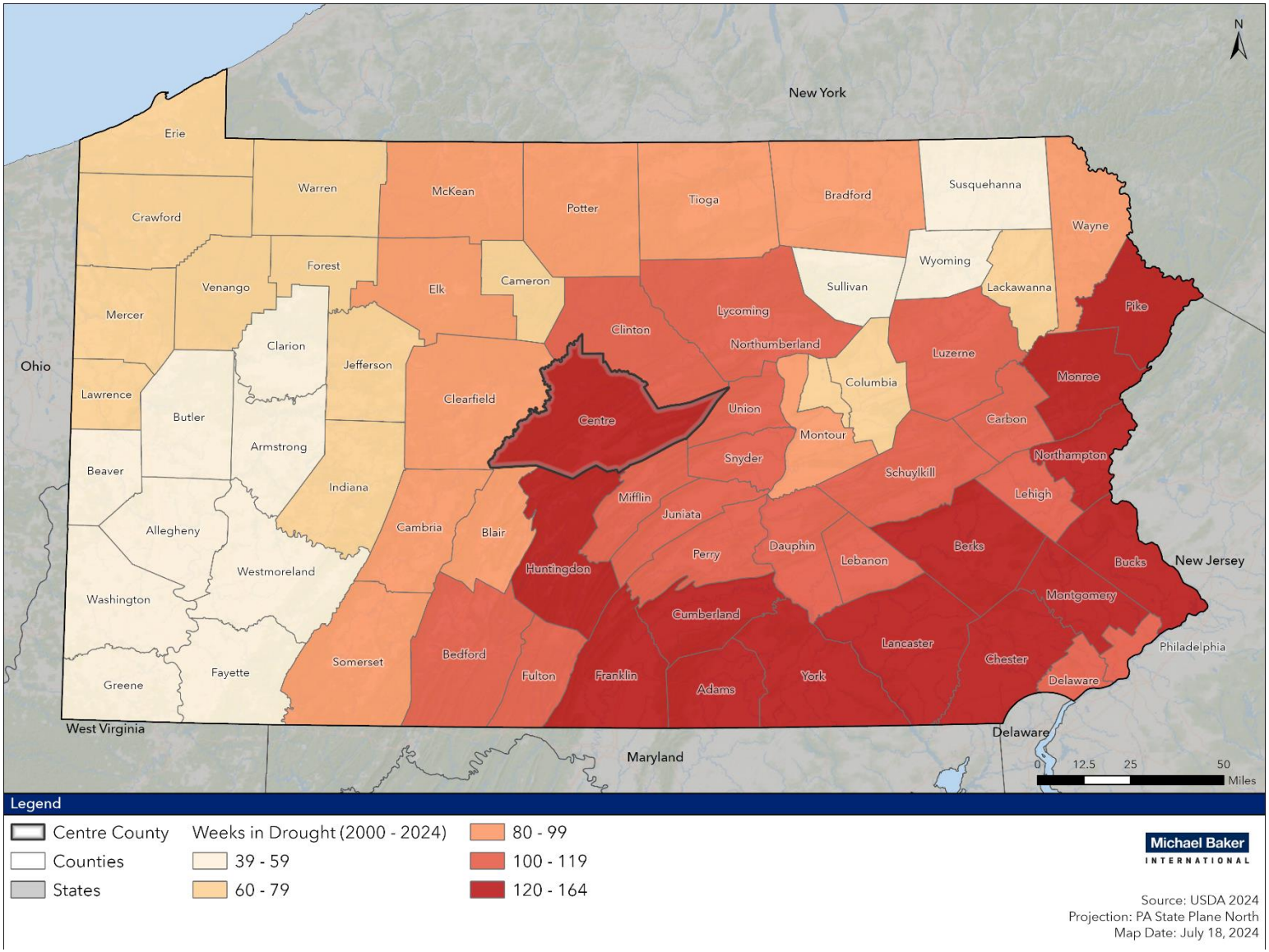
The U.S. Department of Agriculture (USDA) Risk Management Agency operates and manages the Federal Crop Insurance Corporation program. Since Centre County farms are eligible for crop insurance, it is possible to determine agricultural losses due to drought in the County. Table 4.3.1-3 displays the crop loss insurance payments by year due to drought (including even mild drought occurrences) from 2005 through 2024. Please note that data was unavailable for crop years 2015 and 2016. Based on these indemnity payment amounts, crop losses in 2020 were the highest followed by 2011.

Table 4.3.1-4: Crop Loss Insurance Compensation Due to Drought (USDA, 2024)

CROP YEAR	INDEMNITY AMOUNT
2005	$223,228
2006	$24,164
2007	$156,093
2008	$97,009
2009	$0.00
2010	$40,837
2011	$769,958
2012	$100,157
2013	$102,311
2014	$102,311
2015	N/A
2016	N/A
2017	$211,070
2018	$617,499
2019	$466,966
2020	$2,117,561
2021	$61,097
2022	$266,997
2023	$222,809
2024 (through August)	$25,247

One way to measure the magnitude of a drought is through the PDSI. This index is based on several meteorological and hydrological factors, including temperature and soil moisture levels, and is computed weekly by NWS' Climate Prediction Center. The index compares precipitation received against the average amount expected during that period. Droughts are expressed as negative numbers. Palmer values of -2.00 to -2.99 indicate a watch status; values of -3.00 to -3.99 indicate a warning; and values of -4.00 and less indicate an emergency. According to Figure 4.3.1-2, Centre County has experienced between 120 to 164 weeks in drought since 2000. As shown on the map, central and southeast Pennsylvania, including Centre County, experienced more drought years than the rest of the Commonwealth. This is the best data available at the time of this Plan Update.

Figure 4.3.1-2: Weeks in Drought for Centre County from 2000 through 2024



4.3.1.4 Future Occurrence

It is difficult to forecast the severity and frequency of future drought events in Centre County. Centre County has been identified by the U.S. Drought Monitor as being abnormally dry (NIDIS, 2024). Also, over the past five years the declared drought status in Centre County has shifted between "Normal" and "Watch" indicating that conditions are fairly consistent over time (PA DEP, 2024a). While there hasn't been a declared drought status in the past five years, indicators show that local conditions make it possible for there to be a drought. Therefore, the probability of drought impacting Centre County is considered *possible* as defined by the Risk Factor Methodology probability criteria (see Table 4.4-1).

Overall, the County feels that current water needs are being met even during times of drought. However, serious hydrological droughts or supply deficiencies are expected in the future, especially during periods of drought, as continued growth in population, increased demand for water from industry and the effects of land development (which tends to reduce the water table) increase demand. The region around State College is projected to experience an increase in heatwaves by 2050, in addition to warmer conditions doubling in intensity in this time frame according to Climate Central. Climate Central also projects the region will experience droughts more than two times the current amount by 2050 (Climate Central, 2019). With these projections, it is anticipated that the region could become more vulnerable to drought events.

The Climate Mapping for Resilience and Adaptation (CRMA) Tool provides county-level assessment reports for certain hazards, including drought. Figure 4.3.1-3 below shows the report for drought in Centre County. The future climate indicators that may contribute to drought include precipitation and temperature thresholds. According to CRMA, the number of days per year with no precipitation may increase depending on emission scenarios, even if the total annual precipitation is expected to increase. In addition, the annual number of days above 90 degrees Fahrenheit is expected to significantly increase in the future under all emission scenarios.

Figure 4.3.1-3: Centre County Drought Hazard Assessment Report (CRMA, 2024)



Future Climate Indicators

Indicator	Modeled History (1976 - 2005)	Early Century (2015 - 2044)		Mid Century (2035 - 2064)		Late Century (2070 - 2099)	
	Min - Max	Lower Emissions Min - Max	Higher Emissions Min - Max	Lower Emissions Min - Max	Higher Emissions Min - Max	Lower Emissions Min - Max	Higher Emissions Min - Max
Precipitation:							
Average annual total precipitation	**41"** 40 - 43	**43"** 41 - 47	**44"** 41 - 47	**44"** 41 - 49	**44"** 40 - 48	**44"** 41 - 49	**46"** 42 - 50
Days per year with precipitation (wet days)	**208 days** 205 - 214	**206 days** 194 - 217	**206 days** 191 - 215	**206 days** 193 - 219	**205 days** 187 - 216	**205 days** 191 - 214	**202 days** 174 - 226
Days per year with no precipitation (dry days)	**157 days** 151 - 160	**159 days** 148 - 171	**159 days** 150 - 174	**160 days** 147 - 172	**160 days** 149 - 178	**160 days** 151 - 174	**163 days** 139 - 191
Maximum number of consecutive dry days	**10 days** 9 - 11	**10 days** 9 - 12	**10 days** 9 - 13	**10** days 9 - 13	**11 days** 9 - 14	**11 days** 9 - 13	**12 days** 10 - 14
Temperature thresholds:							
Annual days with maximum temperature > 90 °F	**3 days** 3 - 7	**13 days** 5 - 29	**15 days** 6 - 28	**20 days** 7 - 43	**27 days** 10 - 49	**28 days** 9 - 60	**58 days** 19 - 93
Annual days with maximum temperature > 100 °F	**0 days** 0 - 0	**0 days** 0 - 2	**0 days** 0 - 4	**1 days** 0 - 7	**2 days** 0 - 13	**2 days** 0 - 7	**11 days** 0 - 45

4.3.1.5 Vulnerability Assessment

In 1990, the PA DEP had predicted water yield deficiencies for ten county public water supplies. DEP further predicted that Centre County would experience yield deficiencies equal to or greater than the other four counties in the Central West Branch Susquehanna River Sub-basin combined. These have not yet manifested themselves to a significant degree. Centre County, however, is a headwaters location for numerous small watercourses, and therefore communities which rely on surface water can experience the direct impacts to the streams on which they rely. Headwater communities' water supply becomes more vulnerable when stream flows have been reduced by out-of-basin diversions and when there are reductions in stream flow due to low precipitation. Water quality issues, associated with low rainfall periods and the need to meet demand through lower quality water sources, are an ongoing concern with several water service areas. There are 44 public water suppliers recognized within Centre County, which obtain water from surface water and wells. Smaller systems typically use wells and have undersized storage facilities that are incapable of providing adequate operating, emergency and fire reserves. Communities with other water-dependent industries and recreation areas are vulnerable as well. A map of all water service areas within Centre County is included in Figure 4.3.1-3.

Centre County residents that use private domestic wells are more vulnerable to droughts because their drinking water can dry up. Table 4.3.1-4 shows the number of domestic wells per municipality. In 2024, the total number of domestic wells in Centre County is 4,960. Areas most vulnerable to drought due to high numbers of domestic wells are primarily found in the County's townships, with Potter, Benner, Ferguson, and Patton Townships with the highest number of total wells. Domestic well data was obtained from the Pennsylvania Groundwater Information System (PaGWIS). PaGWIS relies on voluntary submissions of well record data by well drillers and is therefore not a complete database of all domestic wells in the County. This is the only comprehensive data set of domestic wells available.

Table 4.3.1-5: PaGWIS Domestic Water Wells Drilled per Municipality (PAGWIS, 2024)

MUNICIPALITY	NUMBER OF REPORTED DOMESTIC WELLS
Bellefonte Borough	35
Benner Township	178
Boggs Township	164
Burnside Township	5
Centre Hall Borough	34
College Township	224

Table 4.3.1-5: PaGWIS Domestic Water Wells Drilled per Municipality (PAGWIS, 2024)

MUNICIPALITY	NUMBER OF REPORTED DOMESTIC WELLS
Curtin Township	35
Ferguson Township	251
Gregg Township	186
Haines Township	98
Halfmoon Township	81
Harris Township	133
Howard Borough	8
Howard Township	35
Huston Township	90
Liberty Township	109
Marion Township	70
Miles Township	93
Milesburg Borough	3
Millheim Borough	6
Patton Township	232
Penn Township	87
Philipsburg Borough	18
Port Matilda Borough	34
Potter Township	318
Rush Township	115
Snow Shoe Borough	0
Snow Shoe Township	75
Spring Township	166
State College Borough	118
Taylor Township	50
Union Township	77
Unionville Borough	1
Walker Township	85
Worth Township	72
Total	**3,286**

The most significant losses resulting from drought events are typically found in the agriculture sector. In 1999, a Gubernatorial Proclamation was issued in part due to significant crop damage. Preliminary estimates by the USDA indicated possible crop losses across the Commonwealth in excess of $500 million. This estimate did not

include a 20 percent decrease in dairy milk production which also resulted in million-dollar losses (NOAA NCEI, 2024). While these were statewide impacts, they illustrate the potential for droughts to severely impair the local economy, especially since a prolonged drought can negatively impact the livelihood of residents within agricultural communities. Prime farmlands in Centre County will be more susceptible to risks from drought, as will public and private water supplies.

Centre County's agricultural production totals $98.8 million. Roughly 38 percent of this total is the production of crops, including nursery and greenhouse crops ($37.2 million); the remaining agricultural production is made up of livestock, poultry, and their products (USDA, 2022). The county also has significant sales in grains, oilseeds, dry beans, and dry peas ($27.1 million). Table 4.3.1-5 lists the top livestock inventory items in Centre County. With these agricultural assets, drought events can severely impair the local economy with prolonged drought negatively impacting the livelihood of residents within agricultural communities particularly.

Table 4.3.1-6: Top Livestock Inventory Items in Centre County (USDA, 2022)

LIVESTOCK	INVENTORY
Cattles and Calves	20,375
Hogs and Pigs	3,250
Layers (Chickens)	4,018
Pullets (Chickens)	64,336

As of the 2022 USDA's Census of Agriculture, Centre County ranks 28th out of the 67 Commonwealth counties in total market value of agricultural products sold. The production value of agricultural products in Centre County was estimated as $98,803,000, which is greater than the last agricultural census conducted in 2017 (USDA, 2022). In addition, Centre County is estimated to have 892 farms on 122,251 acres, with an average size of 137 acres per farm. The agriculture industry has a significant presence in the central and eastern portion of the County with products including dairy, meats, fruits, and vegetables.

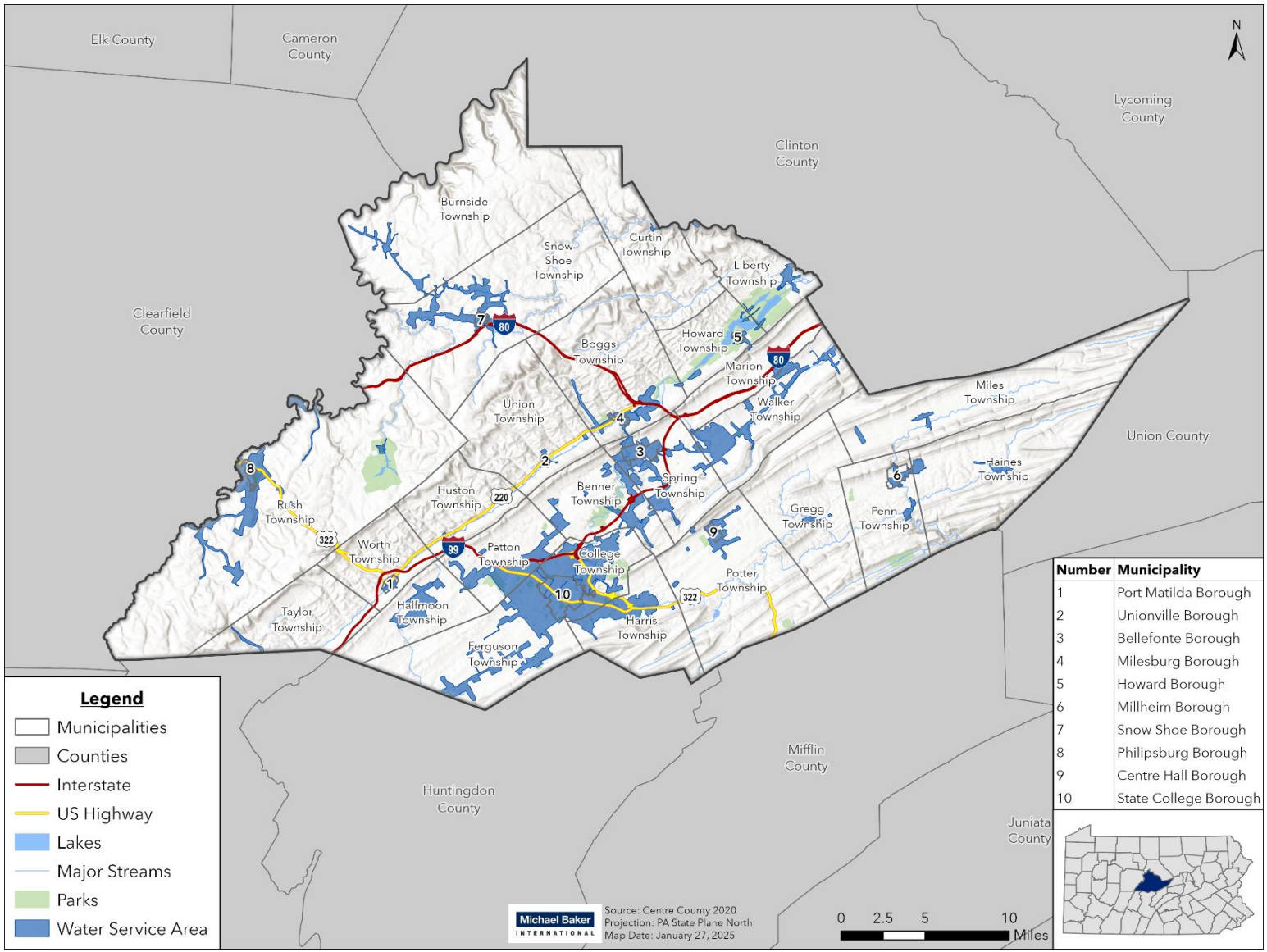
Therefore, drought events can severely impair the local economy with prolonged drought negatively impacting the livelihood of residents within agricultural communities particularly. The Penn State University College of Agricultural Sciences is a valuable resource in reducing drought vulnerability, through education and other services they provide not only to farmers in the area, but to the general public through water conservation education.

Figure 4.3.1-3 shows the public water supply in Centre County. Water service areas are present throughout the county with a majority of service areas occurring in the southern and central portions of Centre County.

4.3.1.6 Equity in Vulnerable Communities

Communities within Centre County with higher concentrations of low-income households could be more susceptible to drought. This includes State College Borough, Bellefonte Borough, and Ferguson Township as they have areas with the highest populations below the poverty level. These households are more likely to live in housing structures with lower-quality infrastructure and higher water bills relative to income.

Figure 4.3.1-4: Public Water Supply in Centre County, 2024



4.3.2 Earthquakes

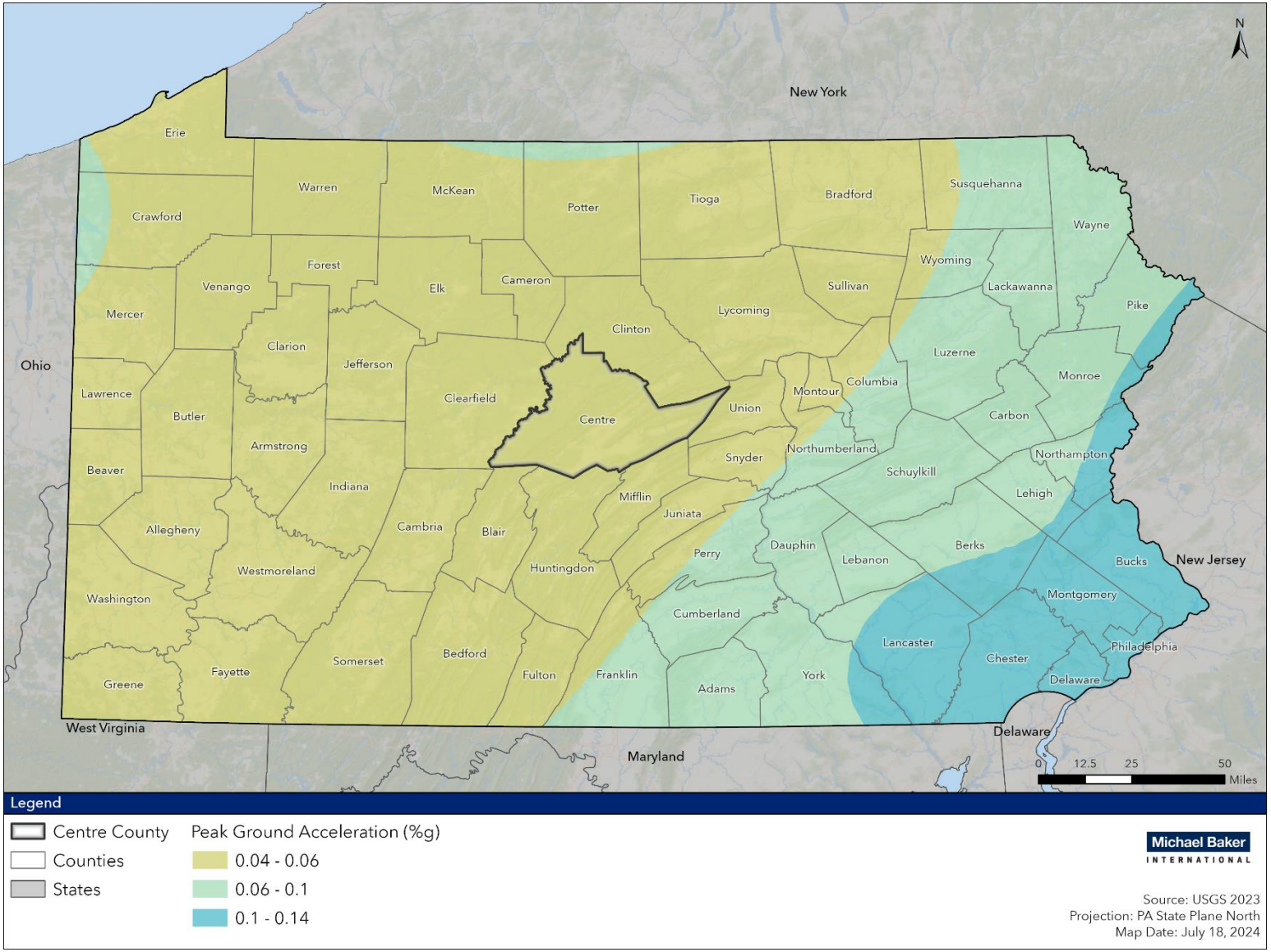
4.3.2.1 Location and Extent



An earthquake is the motion or trembling of the ground produced by sudden displacement of rock usually within the upper 10-20 miles of the Earth's crust. Earthquakes result from crustal strain, volcanism, landslides, or the collapse of underground caverns. They can also result from human activity like mine blasts and nuclear experiments. The closest fault line that might contribute to an earthquake in Centre County is the Mid-Atlantic Ridge, which is approximately 2,000 miles to the east of Pennsylvania (DCNR,2023). As regional hazards, an earthquake would affect all of Centre County. Earthquakes can cause damage to buildings and other rigid superstructures, depending on factors like earthquake magnitude, distance of local areas to the earthquake epicenter, and local geologic conditions. It remains incredibly difficult to predict when and where an earthquake will occur in the northeast United States and Pennsylvania.

Earthquake events in Pennsylvania typically do not impact areas greater than 100 km (62 miles) from the epicenter, and earthquake epicenters in Centre County are rare. The area is generally not known for seismicity, and USGS downgraded the probabilistic seismic hazard for much of Pennsylvania in 2014. Figure 4.3.2-1 shows the earthquake hazard in Pennsylvania and Centre County, expressed as the two-percent probability of exceedance in 50 years of peak ground acceleration (g). The following map was digitized from the National Seismic Hazard report. Centre County lies in the 0.04 zone, indicating that the hazard is slight to moderate. However, earthquakes originating outside of Pennsylvania can affect Centre County, though they are not expected to cause significant damage. This was the most current data available when updating this plan.

Figure 4.3.2-1: Approximate USGS Seismic Hazard for Pennsylvania, 2023



4.3.2.2 Range of Magnitude

There are several different ways of describing the magnitude of an earthquake. One method measures peak ground acceleration. Peak ground acceleration is the maximum horizontal ground acceleration measured in centimeters per second per second (cm/sec^2) (USGS, 2019). Peak ground acceleration can range from zero for an earthquake that is noticed by very few people to 350, which would be categorized as a catastrophic event. A peak ground acceleration of 10 cm/sec^2 means that the shaking is equivalent to about one percent of the acceleration due to gravity. Generally, ground acceleration must exceed 15 cm/sec^2 for significant damage to occur.

Earthquake magnitude is often measured using the Richter Scale, an open-ended logarithmic scale that describes the energy release of an earthquake (DCNR,2023). Table 4.3.2-1 below summarizes Richter Scale magnitudes as they relate to the spatial extent of impacted areas. Pennsylvania has not experienced any earthquakes with a magnitude greater than 6.0.

Table 4.3.2-1: Richter Scale Magnitudes and Associated Earthquake Size Effects

RICHTER MAGNITUDES	EARTHQUAKE EFFECTS
Less than 3.5	Generally not felt but recorded.
3.5-5.4	Often felt, but rarely causes damage.
Under 6.0	At most, slight damage to well-designed buildings; can cause major damage to poorly constructed buildings over small regions.
6.1-6.9	Can be destructive up to about 100 kilometers from epicenter.
7.0-7.9	Major earthquake; can cause serious damage over large areas.
8.0 or greater	Great earthquake; can cause serious damage in areas several hundred kilometers across.

The Richter Scale does not give any indication of the impact or damage of an earthquake, although it can be inferred that higher magnitude events cause more damage. Therefore, another way of measuring the intensity of an earthquake is the Modified Mercalli Intensity Scale (DCNR,2023). Measures on this scale range from I, an earthquake that is not generally noticeable, to XII, an earthquake that causes complete destruction. The table below summarizes Modified Mercalli Intensity Scale impacts of earthquake events, measured in terms of earthquake intensity.

Table 4.3.2-2: Modified Mercalli Intensity Scale with Associated Impacts

SCALE	INTENSITY	DESCRIPTION OF EFFECTS	CORRESPONDING RICHTER SCALE MAGNITUDE
I	Instrumental	Usually detected only on seismographs.	<4.2
II	Feeble	Some people feel it	
III	Slight	Felt by people resting; like a truck rumbling by	
IV	Moderate	Felt by people walking	
V	Slightly Strong	Sleepers awake; church bells ring	<4.8
VI	Strong	Trees sway; suspended objects swing; objects fall off shelves	<5.4
VII	Very Strong	Mild alarm, walls crack, plaster falls	<6.1
VIII	Destructive	Moving cars uncontrollable, masonry fractures, poorly constructed buildings damaged	<6.9
IX	Ruinous	Some houses collapse, ground cracks, pipes break open	
X	Disastrous	Ground cracks profusely, many buildings destroyed, liquefaction and landslides widespread	<7.3
XI	Very Disastrous	Most buildings and bridges collapse, roads, railways, pipes and cables destroyed, general triggering of other hazards	<8.1
XII	Catastrophic	Total destruction, trees fall, ground rises and falls in waves	>8.1

Recent earthquakes in Pennsylvania have been measured from IV to VI on the Modified Mercalli Intensity Scale. However, since the worst earthquake recorded in Pennsylvania was a magnitude 5.2, a worst-case scenario for this hazard would be if an earthquake of similar magnitude occurred in or around Centre County near a populated area. Environmental impacts of earthquakes can be numerous, widespread, and devastating, particularly if indirect impacts like economic impacts are considered. Earthquakes are known for causing induced tsunamis, flooding, landslides, and avalanches; poor water quality; damage to vegetation; and breakage in sewage or toxic material containments (USGS, 2024). However, because of its geographic location, these impacts are extremely unlikely to occur in Centre County.

The potential impacts of earthquakes on community lifelines are as follows:

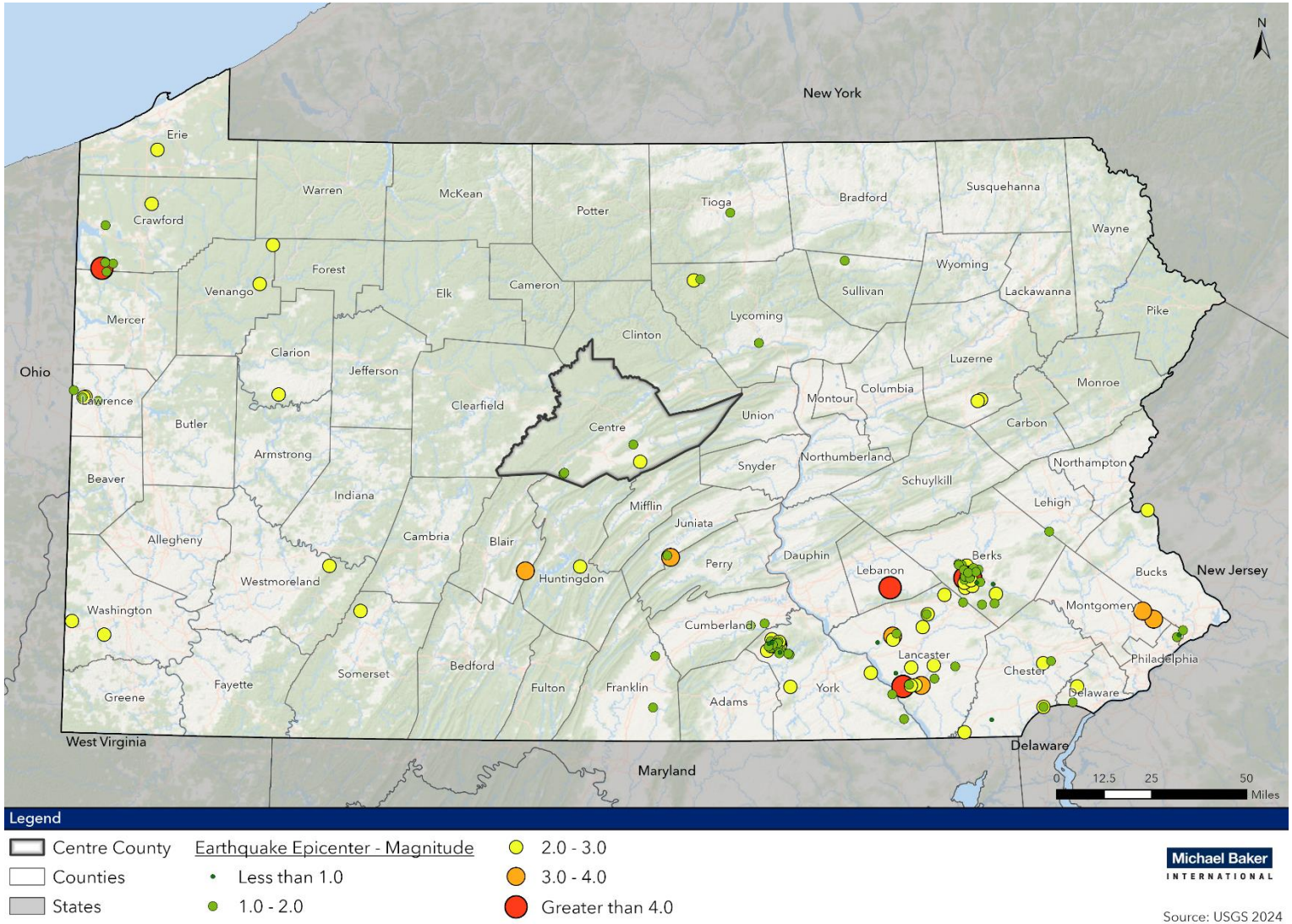
Table 4.3.2-3: Most Likely Lifelines Impacted by Earthquakes

LIFELINES	NOTES
	Shelters may be affected depending on severity. Higher earthquake building standards can aid in mitigation.
	Personnel will likely be overutilized in response and recovery, leading to potential gaps in capability.
	Pipelines may be affected. Mitigation includes requiring higher building standards.

4.3.2.3 Past Occurrence

According to records maintained by DCNR, there have been four earthquakes recorded with epicenters in Centre County. A light earthquake was recorded in Centre County on August 15, 1991, measuring 3.0 on the Richter scale. This earthquake occurred about 10 miles east of State College, and authorities reported no damage. Only three other earthquake epicenters have been measured in Centre County. However, parts of the County have likely experienced shock waves from some minor earthquakes that have occurred around the region shown on Figure 4.3.2-2. For example, 10 occurrences of loud bangs and tremors were reported to the Centre County OES in October 2018. These occurred around the eastern side of Bellefonte Borough. In May 2019, tremors were again reported to the County from an earthquake in nearby Juniata County. The earthquake measured 3.4 on the Richter scale, however there were no reports of damage in Centre County. Most recently, a 4.8 magnitude earthquake centered about 45 miles west of New York City and 50 miles north of Philadelphia occurred in 2024, with tremors reported in Centre County. No damage was reported to the Centre County OES (Centre Daily Times, 2024).

Figure 4.3.2-2: Map of Earthquake Epicenters in Centre County, 2024



4.3.2.4 Future Occurrence

The probability of an earthquake event occurring in Centre County is very low. Centre County does not sit on any fault lines; therefore, it is reasonable to believe that the County will not experience earthquake damage anytime soon. The future occurrence of earthquakes can be considered *unlikely* as defined by the Risk Factor Methodology probability criteria (see Table 4.4.1-1). There is no expected impact from climate change on the future occurrence of earthquakes or their impacts.

4.3.2.5 Vulnerability Assessment

All structures and infrastructure in Centre County are equally at risk of experiencing an earthquake. However, in a mild earthquake of the magnitude typically experienced in Pennsylvania, no structural damage is anticipated. In other cases, damages are expected to be limited, and examples of anticipated damages are broken dishes and windows and toppled file cabinets.

However, for earthquakes, the available history covers a period of less than 300 years, which is a relatively short period of time for an examination of earthquakes. Large earthquakes may only affect a location every several centuries or millennia. Environmental impacts of earthquakes can be numerous, widespread and devastating, particularly if indirect impacts are considered. Some secondary hazards caused by earthquakes may include fire, hazardous material release, landslides, flash flooding, avalanches, tsunamis, and dam failure. These secondary events could also result in disruptions to natural ecosystems, poor water quality, damage to vegetation, and the release of toxic materials and sewage. Impacts to infrastructure could include train derailments, pipeline failures, and utility interruptions. A very large earthquake affecting Centre County might cause structural damage in dilapidated structures or structures that do not meet current building codes. Thus, the impact of an earthquake might range from negligible to catastrophic. Based on historical data for Centre County, damage is likely to be minimal.

Structures identified as potentially at risk of damage due to an earthquake are older structures. All existing buildings have the potential to experience an earthquake. Given no history of damage in Centre County due to earthquake, damages are estimated to be limited to the more dilapidated structures and structures with unreinforced masonry. The number of structures that are at least 55 years old in Centre County is 23,705 (U.S. Census Bureau, 2022). The U.S. Census Bureau data on housing age is presented in decades, so that number comes from all structures built in 1969 or earlier.

Table 4.3.2-4: Structures at Least 55 Years Old by Municipality (US Census, 2022)

MUNICIPALITY	STRUCTURES AT LEAST 55 YEARS OR OLD
Bellefonte Borough	2163
Benner Township	465
Boggs Township	377
Burnside Township	128
Centre Hall Borough	474
College Township	1328
Curtin Township	187
Ferguson Township	2088
Gregg Township	471
Haines Township	402
Halfmoon Township	134
Harris Township	709
Howard Borough	187
Howard Township	143
Huston Township	171
Liberty Township	296
Marion Township	138
Miles Township	337
Milesburg Borough	256
Millheim Borough	222
Patton Township	1183
Penn Township	203
Philipsburg Borough	1159
Port Matilda Borough	232
Potter Township	415
Rush Township	978
Snow Shoe Borough	174
Snow Shoe Township	356
Spring Township	1532
State College Borough	5948
Taylor Township	119
Union Township	158
Unionville Borough	97
Walker Township	393
Worth Township	82
Total	**23,705**

All future structures will also have the potential to experience an earthquake. However, given that new structures must meet current building codes and given the expected magnitude of earthquakes in the County, no property damages are anticipated.

4.3.2.6 Equity in Vulnerable Communities

Communities within Centre County with a large renter population may be more at risk during an earthquake due to a lack of control over the seismic safety of their buildings. This includes State College Borough, Bellefonte Borough, Patton Township, College Township, Ferguson Township, and Spring Township. Renter protections may also be affected due to a lack of renter protections or access to temporary housing after an earthquake. Low-income communities may also be at greater risk as these households often live in older or poorly constructed housing, which is more likely to sustain damage during an earthquake. People with disabilities or limited mobility also face greater challenges in evacuating during an earthquake and accessing post-disaster services. In terms of emergency notification, households without smartphones and lack of access to the internet will affect how people get emergency communications. Ensuring equitable access to such technologies and providing information in multiple languages and formats is critical.

4.3.3 Extreme Temperature



Extreme temperatures include both hot and cold temperatures. Extreme cold temperatures drop well below what is considered normal for an area during the winter months and often accompany winter storm events. Combined with increases in wind speed, such temperatures in Pennsylvania can be life threatening to those exposed for extended periods of time. Extreme heat can be described as temperatures that are above the average high temperature for a region during the summer months.

4.3.3.1 Location and Extent

All of Centre County may be subject to extreme temperatures in the summer and winter seasons. Areas most susceptible to extreme heat include urban environments, as buildings and pavement absorb and retain heat, causing an Urban Heat Island Effect. Areas most susceptible to extreme cold include higher elevations. Different populations and industries may experience extreme temperatures differently. Demographics must also be considered, as large populations of elderly or poor represent those most vulnerable to temperature extremes.

Figure 4.3.3-1 and Figure 4.3.3-2 show annual mean maximum and minimum temperatures throughout Pennsylvania and highlight Centre County. These maps present the year-round average minimum temperature (41.7°F) and average maximum temperature (58.5°F). Elevation and topography account for local differences seen on the maps. However, during the summer, the average high temperature is 79.1°F and the average low is 61.4°F in Centre County. In winter, the average high in Centre County is 36.4°F and the average low is 22.7°F (NOAA-NCEI, 2024b).

Figure 4.3.3-1: Average Minimum Temperature in Centre County, 2021

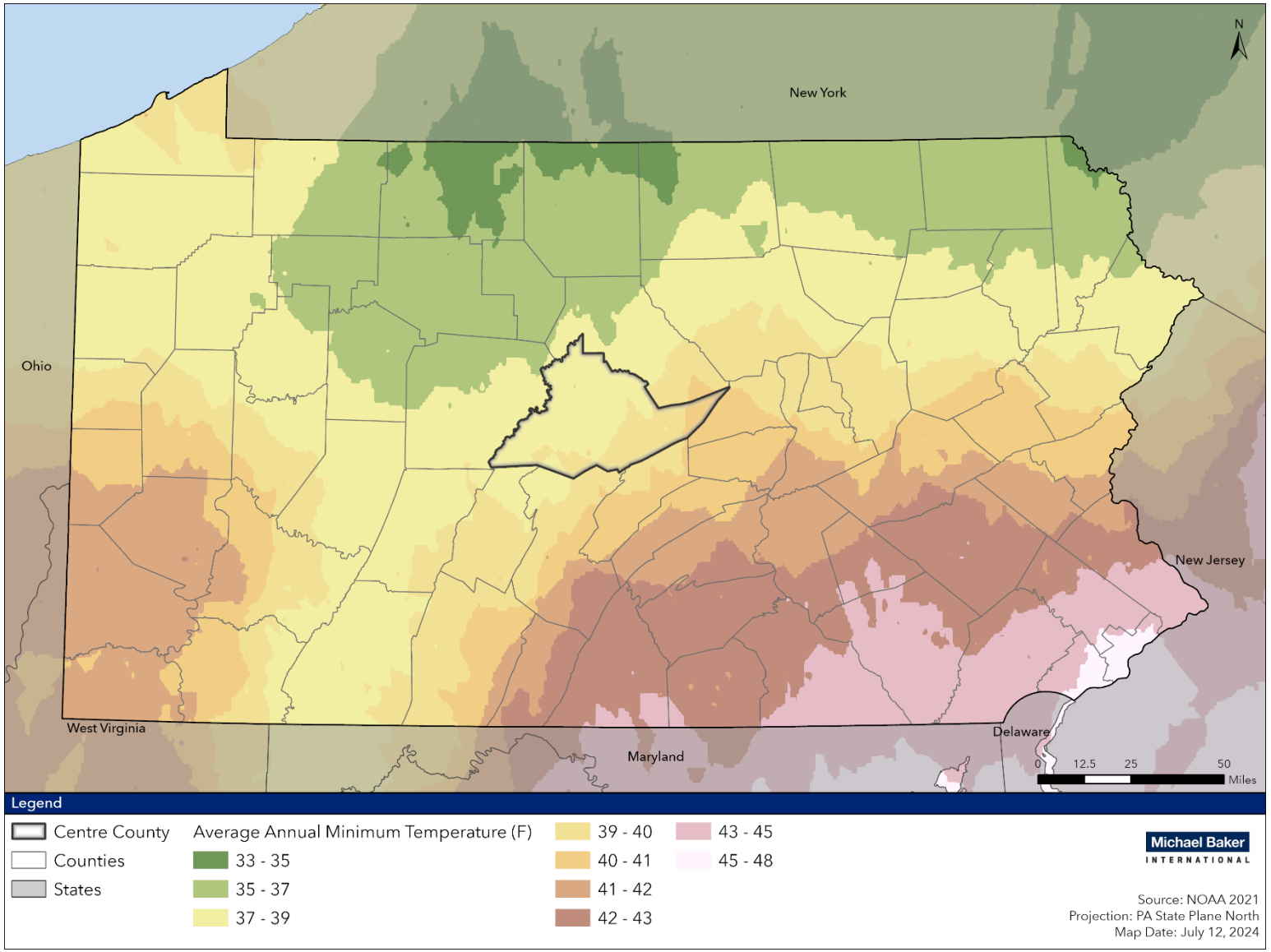
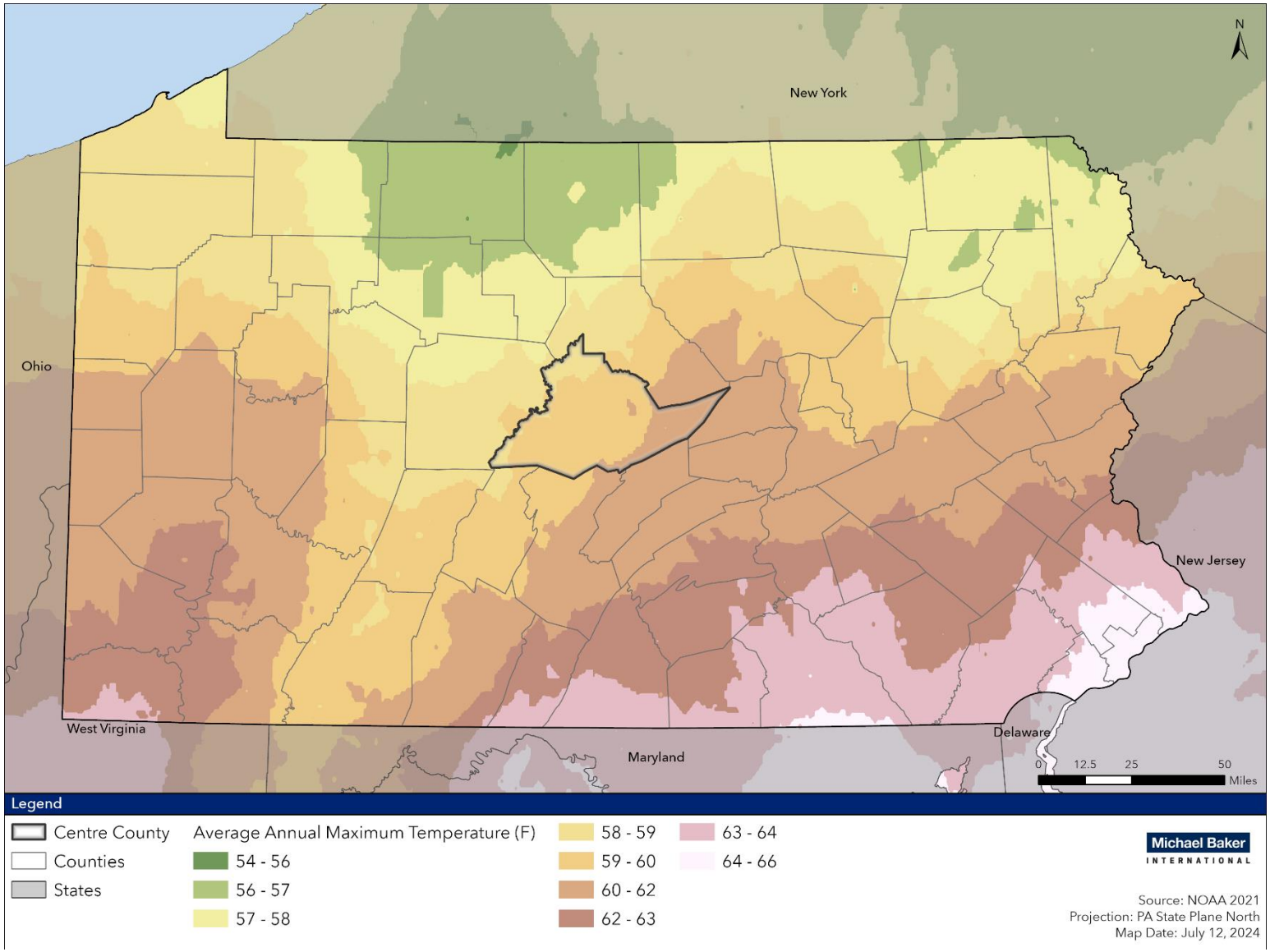


Figure 4.3.3-2: Average Maximum Temperature in Centre County, 2021



4.3.3.2 Range of Magnitude

Extreme temperatures can be disruptive and/or dangerous, especially for the elderly, disabled, poor, and otherwise disadvantaged members of communities. Extreme heat and cold can also impact transportation, agriculture, and energy supplies.

The following impacts can be observed in conjunction with extreme temperature events:

- Health Impacts: Both extreme cold and extreme heat can cause severe health impacts. The impacts of severe cold include hypothermia and frostbite from prolonged exposure. Cold weather also raises the risk of injuries from falls, traffic incidents, carbon monoxide poisoning, and house fires. Health impacts of extreme heat include heat stroke and dehydration. The health impacts of extreme cold are greater in terms of mortality in humans, but often after more prolonged exposure vs. a cold snap. Extreme heat waves, however, can prove more deadly over a shorter duration. Both extreme heat and extreme cold are most likely to impact the elderly, low-income individuals, residents with disabilities and pre-existing medical conditions, and laborers and farm workers.
- Transportation: Cold weather can impact automotive engines, possibly stranding motorists; limit or prevent travel by pedestrians, bicyclists, and users of public transportation; and stress metal bridge structures. Highways and railroad tracks can become distorted in high heat. Disruptions to the transportation network and accidents due to extreme temperatures represent an additional risk.
- Agriculture: Absolute temperature and duration of extreme cold can have devastating effects on trees and winter crops. Livestock is especially vulnerable to heat. Crop yields can be impacted by heat waves or cold snaps that occur during key development stages, even at levels that do not impact most of the population.
- Energy: Energy consumption rises significantly during extreme cold weather, and any fuel shortages or utility failures that prevent the heating of a dwelling place residents in extreme danger. Extreme heat also can result in utility interruptions, and sagging transmission lines due to the heat can lead to shorting out.

The range of these impacts, especially health effects, can be mitigated through improved forecasts, warnings, community preparedness, and appropriate community response. A worst-case event for Centre County would include extreme cold temperatures combined with an interruption in energy supplies and loss of access to medical care from snow or ice impacting travel. Medical afflictions could result from

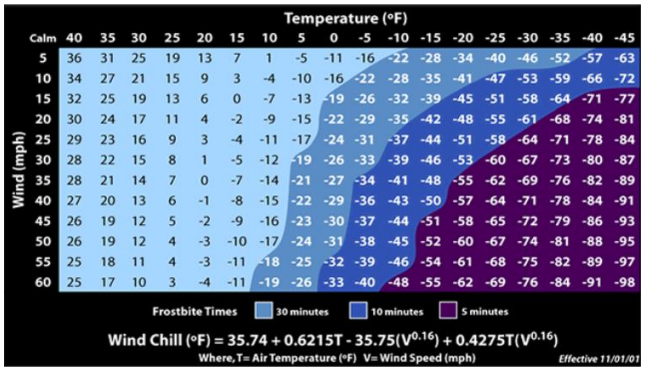
direct influence on the coronary circulation system and the respiratory system; influenza and other infectious diseases would be secondary impacts.

The experience of extreme heat and extreme cold varies considerably depending on humidity and wind conditions, respectively. Figure 4.3.3-3 shows the effects of wind speed on extreme cold events and humidity on extreme heat events. These compounding factors can increase the risk experienced by vulnerable populations and the general public. While the temperatures in Figure 4.3.3-3 serves as a guide for various danger categories, the impacts of high temperatures will vary from person to person based on individual age, health, and other factors.

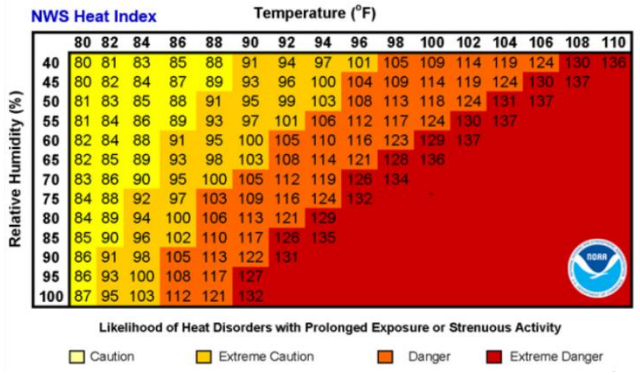
NWS issues temperature advisories, watches, and warnings. Exact thresholds vary across the Commonwealth, but in general heat advisories are issued when the heat index will be equal to or greater than 100°F, but less than 105°F, excessive heat warnings are issued when heat indices will attain or exceed 105°F, and excessive heat watches are issued when there is a possibility that excessive heat warning criteria may be experienced within twelve to forty-eight hours. Similarly, NWS issues wind chill warnings, watches, and advisories. A wind chill warning is issued when extremely cold wind chill values are occurring; a watch when extremely cold wind chill values are possible; and an advisory when seasonably cold wind chill values are occurring (NOAA NWS, 2024a).

Figure 4.3.3-3: Effects of Wind Speed on Extreme Cold Events (Wind Chill) and Humidity on Extreme Heat Events (Heat Index) (NOAA NWS, 2024b) (NOAA NWS, 2024c)

Extreme Cold and Wind Chill



Extreme Heat and Heat Index



Major human risks to extremely high temperatures include heat cramps, heat syncope, heat exhaustion, heatstroke, and death. The elderly, the very young, and those with low or no income are most vulnerable to health-related impacts of extreme temperatures. Cold temperatures can be extremely dangerous to

humans and animals exposed to the elements. Without heat and shelter, cold temperatures can cause hypothermia, frost bite, and death. Wind chill temperatures are often used in place of raw temperature values due to the effect of wind can have in drawing heat from the body under cold temperatures.

The potential impacts of extreme temperature on community lifelines are as follows:

Table 4.3.3-1: Most Likely Lifelines Affected by Extreme Temperature

LIFELINES	NOTES
	Government operations and facilities, including police and fire, will be needed for response and recovery. Landlords and utility companies will need to respond to infrastructure issues for residents.
	Medical care will be needed in extreme events, and the facilities themselves will need effective heating and cooling infrastructure.
	Extreme temperatures will lead to a larger strain on the power grid due to an increased usage of heating and cooling utilities in response.

4.3.3.3 Past Occurrence

Historically, the highest and lowest recorded temperatures in central Pennsylvania, as observed by NWS in State College, PA were 102 degrees (July 17, 1988) and -20 degrees on February 10, 1898. In more recent memory, a record low -18 degrees was recorded on January 21, 1994. At this location, in the summer of 1998, four record days were set for maximum temperature in early and mid-July, ranging from 101 to 103 degrees. For record cold temperatures, the winter of 2009 set two records of -6 and -13 degrees respectively on consecutive days in January. There have also been numerous cold weather days with extreme wind chills, as shown in Table 4.3.3-1. Since 2015, there has been one recorded extreme temperature event in the County through NCEI. A heat advisory was issued for Centre County in late June 2024 as heat index values were greater than 100 (Kines, 2024).

Table 4.3.3-2: Previous Temperature Extremes Impacting Centre County, 2004-2024 (NOAA NCEI, 2024a)

DATE	EVENT	TEMPERATURE (HEAT INDEX AND WIND CHILL)	DEATHS	INJURIES	PROPERTY DAMAGE RECORDED	CROP DAMAGE RECORDED
12/20/2004	Cold/Wind Chill	NA	0	0	$0.00	$0.00
7/17/2006	Heat	Mid 90s° F (heat index of 96 – 101)	0	0	$0.00	$0.00
8/1/2006	Heat	Low 90s° F (heat index of 97 – 102)	0	0	$0.00	$0.00
1/26/2007	Extreme Cold/Wind Chill	-15° F (with wind chill)	0	0	$0.00	$0.00
2/3/2007	Extreme Cold/Wind Chill	-30°F (with wind chill)	0	0	$0.00	$0.00
2/5/2007	Extreme Cold/Wind Chill	-15° F (with wind chill)	0	0	$0.00	$0.00
2/16/2007	Extreme Cold/Wind Chill	-15° F (with wind chill)	0	0	$0.00	$0.00
3/6/2007	Extreme Cold/Wind Chill	-20° F (with wind chill)	0	0	$0.00	$0.00
2/10/2008	Extreme Cold/Wind Chill	-20° F (with wind chill)	0	0	$0.00	$0.00
12/21/2008	Extreme Cold/Wind Chill	-20° F (with wind chill)	0	0	$0.00	$0.00
1/15/2009	Extreme Cold/Wind Chill	-30° F (with wind chill)	0	0	$0.00	$0.00
1/16/2009	Extreme Cold/Wind Chill	-30° F (with wind chill)	0	0	$0.00	$0.00
3/2/2009	Extreme Cold/Wind Chill	-25° F (with wind chill)	0	0	$0.00	$0.00
1/6/2014	Extreme Cold/Wind Chill	-50° F (with wind chill)	0	0	$0.00	$0.00
1/28/2014	Extreme Cold/Wind Chill	-30° F (with wind chill)	0	0	$0.00	$0.00
2/15/2015	Extreme Cold/Wind Chill	-35° F (with wind chill)	0	0	$0.00	$0.00
2/19/2015	Extreme Cold/Wind Chill	-35° F (with wind chill)	0	0	$0.00	$0.00
1/30/2019	Extreme Cold/Wind Chill	-30° F (with wind chill)	0	0	$0.00	$0.00
12/23/2022	Extreme Cold/Wind Chill	-35° F (with wind chill)	0	0	$0.00	$0.00

4.3.3.4 Future Occurrence

Due to its location and geography, the County is more likely to encounter extreme cold weather than excessive heat. Topography and vegetation can impact temperature differentials across the County. The probability of an extreme temperature event in Centre County is considered *possible* as defined by the Risk Factor Methodology probability criteria (see Table 4.4-1).

According to the Fifth National Climate Assessment, which utilized the Intergovernmental Panel on Climate Change's Shared Socioeconomic Pathways (SSP) (RCP) 4.5 and 8.5 scenarios, the annual average temperature across the United States is projected to increase by 2.5°F (RCP 4.5) or 2.9°F (RCP 8.5) between 2021 and 2050, relative to 1976-2005. The RCP 4.5 scenario assumes moderate measures are taken to reduce emissions, while the 8.5 scenario assumes a lower effort and thus more severe impacts. For the Northeast region, the change in annual average temperature is 3.98°F (RCP 4.5) or 5.09°F (RCP 8.5) by 2036-2065 and 5.27°F (RCP 4.5) or 9.11°F (RCP 8.5) by 2071-2100. These changes translate to approximately 20 to 30 more days above 90°F and 20 to 30 fewer days below freezing in the northeastern parts of the United States by mid-century (RCP 8.5) (Jay et al. 2023). Climate Central also projects an increase in extreme temperature events in the Centre County region. Warming intensity is expected to double by 2050 and heatwaves are expected to increase (Climate Central, 2019).

The Climate Mapping for Resilience and Adaptation (CRMA) Tool provides a county-level assessment report for extreme heat, shown in Figure 4.3.3-4 below. The future climate indicators that may contribute to extreme heat are temperature thresholds and annual temperature. According to CRMA, the number of days per year above both 90- and 95-degrees Fahrenheit are expected to increase in the future under all emission scenarios. The annual single highest maximum temperature is projected to be nearly 100 degrees Fahrenheit by midcentury. These changes may intensify the impacts from extreme heat.

Figure 4.3.3-4: Centre County Extreme Heat Hazard Assessment Report (CRMA, 2024)



Future Climate Indicators

Indicator	Modeled History (1976 - 2005)	Early Century (2015 - 2044)		Mid Century (2035 - 2064)		Late Century (2070 - 2099)	
		Lower Emissions	Higher Emissions	Lower Emissions	Higher Emissions	Lower Emissions	Higher Emissions
	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
Temperature thresholds:							
Annual days with maximum temperature > 90°F	3 days 3 - 7	13 days 5 - 29	15 days 6 - 28	20 days 7 - 43	27 days 10 - 49	28 days 9 - 60	58 days 19 - 93
Annual days with maximum temperature > 95°F	0 days 0 - 1	3 days 0 - 11	3 days 1 - 10	5 days 1 - 22	9 days 1 - 24	9 days 1 - 33	28 days 4 - 67
Annual days with maximum temperature > 100°F	0 days 0 - 0	0 days 0 - 2	0 days 0 - 4	1 days 0 - 7	2 days 0 - 13	2 days 0 - 7	11 days 0 - 45
Annual days with maximum temperature > 105°F	0 days 0 - 0	0 days 0 - 0	0 days 0 - 1	0 days 0 - 1	0 days 0 - 5	0 days 0 - 3	4 days 0 - 28
Annual temperature:							
Annual single highest maximum temperature °F	92 °F 91 - 93	96 °F 93 - 99	96 °F 94 - 101	98 °F 94 - 103	99 °F 95 - 106	99 °F 95 - 106	104 °F 95 - 114
Annual highest maximum temperature averaged over a 5-day period °F	88 °F 87 - 88	91 °F 88 - 95	91 °F 89 - 95	93 °F 89 - 98	94 °F 90 - 101	94 °F 90 - 101	99 °F 91 - 110
Cooling degree days (CDD)	459 degree-days 405 - 502	718 degree-days 550 - 969	758 degree-days 564 - 1,024	875 degree-days 618 - 1,241	1,018 degree-days 729 - 1,389	1,041 degree-days 667 - 1,559	1,629 degree-days 1,003 - 2,394

N/A = Data Not Available for the selected area

4.3.3.5 Vulnerability Assessment

The potential for extreme heat and cold always exists in and around the summer and winter months. Meteorologists and weather forecasters can normally predict the temperature with excellent accuracy. Adhering to extreme temperature warnings can significantly reduce the risk of temperature related illness or death. Those hardest hit by both heat and cold waves include the elderly, disabled, and those who are socio-economically disadvantaged. Excessive heat exposure also affects people with certain pre-existing medical conditions, including cardiovascular disease, respiratory illnesses, and obesity. All 35 jurisdictions are considered vulnerable to the effects of extreme temperatures, but these vulnerabilities can vary across the general population. Efforts to mitigate the impacts should focus on those groups most vulnerable. Table 4.3.3-3 lists the populations that may be more vulnerable to extreme temperature events by municipality.

Table 4.3.3-3: Populations Vulnerable to Extreme Temperatures by Municipality (US Census, 2022)

MUNICIPALITY	POPULATION OVER 65 YEARS OLD	DISABLED POPULATION
Bellefonte Borough	1,173	897
Benner Township	1,480	468
Boggs Township	687	539
Burnside Township	110	64
Centre Hall Borough	248	221
College Township	2,090	979
Curtin Township	133	76
Ferguson Township	3,145	1,757
Gregg Township	489	309
Haines Township	250	122
Halfmoon Township	447	322
Harris Township	1,178	591
Howard Borough	110	114
Howard Township	185	92
Huston Township	212	162
Liberty Township	336	321
Marion Township	178	166
Miles Township	292	146
Milesburg Borough	229	292
Millheim Borough	134	129
Patton Township	2,031	1,294
Penn Township	166	118

Table 4.3.3-3: Populations Vulnerable to Extreme Temperatures by Municipality (US Census, 2022)

MUNICIPALITY	POPULATION OVER 65 YEARS OLD	DISABLED POPULATION
Philipsburg Borough	527	630
Port Matilda Borough	130	95
Potter Township	1,254	647
Rush Township	984	614
Snow Shoe Borough	138	158
Snow Shoe Township	322	266
Spring Township	1,373	848
State College Borough	2,785	2,998
Taylor Township	175	94
Union Township	228	188
Unionville Borough	43	28
Walker Township	1,139	584
Worth Township	148	94
Total	**24,549**	**16, 423**

4.3.3.6 Equity In Vulnerable Communities

Low-income households and renter households may be at greater risk during extreme weather risks. Energy bills may be disproportionately expensive regarding income in these households and in the event of heating and cooling system malfunctions, renters may be unable to make key decisions. Elderly populations (those 65+ and older) will need extra consideration as they are more susceptible to negative health effects related to extreme temperatures. This means areas of State College Borough, Bellefonte Borough, Centre Hall Borough, Patton Township, College Township, Ferguson Township, Gregg Township, Harris Township, Potter Township, Rush Township, Philipsburg Borough, and Spring Township may be particularly vulnerable.

4.3.4 Flood, Flash Flood, Ice Jam



4.3.4.1 Location and Extent

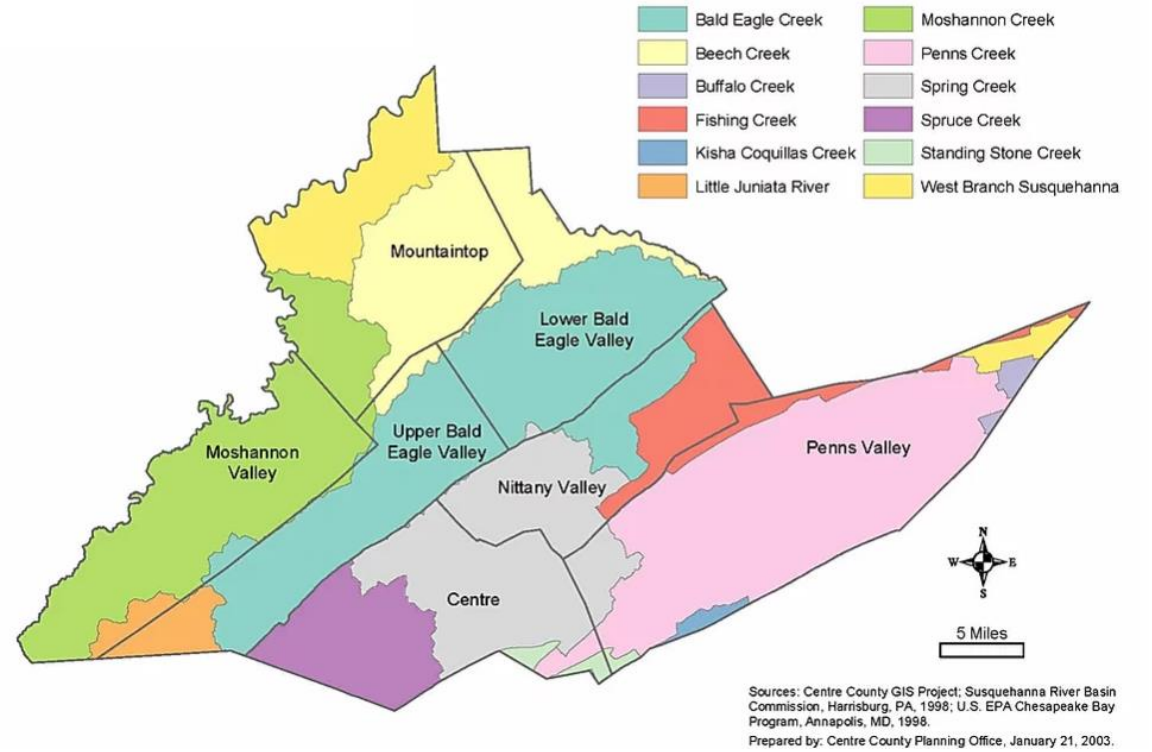
Flooding is the temporary condition of partial or complete inundation on normally dry land and it is the most frequent and costly of all natural hazards in Pennsylvania. Flooding occurs when excess water from snowmelt or rainfall fills a stream, causing it to overflow onto the stream banks and adjacent floodplains. Floodplains are lowlands adjacent to rivers, streams, and creeks that are subject to recurring floods.

Flash flood conditions can result from a large amount of rainfall over a short time span. Though, a small amount of rain can also result in floods in locations where the soil is frozen or saturated from a previous wet period or if the rain is concentrated in an area of impervious surfaces such as large parking lots, paved roadways, or other densely developed areas.

Snow melt combined with heavy rains can cause frozen rivers to swell, which can break the ice layer on top of a river. If this occurs, large chunks can float downstream, piling up in narrow passages and near other obstructions such as bridges and dams causing an ice jam.

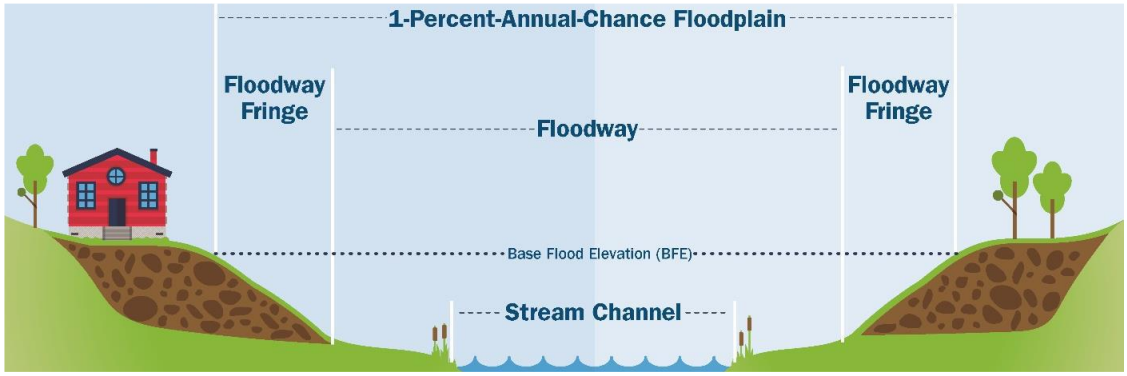
Centre County lies in the Susquehanna River Basin, one of the most flood prone river basins in the nation. The Susquehanna River Basin encompasses almost half the State and continues into Maryland where the river drains into the Chesapeake Bay. Waterways throughout the County flow into the Susquehanna River, although the river does not flow through Centre County itself (PACD, 2020). The County can be further broken down into minor watersheds around local waterways. Figure 4.3.4-1 illustrates these watersheds with an overlay of the Centre County Planning Districts. Spring Creek Watershed has been identified as a focus area for watershed maintenance due to expected growth in population and development. While this local watershed only covers about 13 percent of the County's total land area, it accounts for about 72 percent of the County's total population (Spring Creek Watershed Commission, 2017; U.S. Census Bureau, 2022).

Figure 4.3.4-1: Centre County Susquehanna River Basin Watersheds and Planning Districts (Spring Creek Watershed Commission, 2017)



The size of the floodplain is described by the recurrence interval of a given flood. Flood recurrence intervals are explained in more detail in Section 4.3.3.4. However, in assessing the potential spatial extent of flooding it is important to know that a floodplain associated with a 1-percent-annual chance of occurring in a given year is smaller than the floodplain associated with a flood that has a 0.2-percent-annual chance of occurring. The National Flood Insurance Program (NFIP), for which the Flood Insurance Rate Map (FIRM) is published, identifies the risk associated with the 1-percent-annual-chance flood. This 1-percent-annual chance flood event is used to delineate the Special Flood Hazard Area (SFHA) and to identify Base Flood Elevations (BFE), terms identified in Figure 4.3.4-2. The SFHA serves as the primary regulatory boundary used by FEMA, the Commonwealth, and the County when determining flood risk.

Figure 4.3.4-2: Diagram Identifying the Special Flood Hazard Area, Floodway and Flood Fringe



The effective FIRM was published for Centre County on January 16, 2015 and May 4, 2009. An example of the mapping products published is shown in Figure 4.3.4-3, which illustrates flood hazard areas along Spring Creek in Bellefonte, Benner, and Spring Townships. The current Flood Insurance Study (FIS) report was published for Centre County on January 16, 2015 (FEMA, 2015). This remains the most recent flood hazard data, which was used to update this flood hazard profile. The FIRM and FIS for the entire County can be obtained from the FEMA Map Service Center (http://www.msc.fema.gov) and can be used to identify the expected spatial extent and elevation of flooding from a 1-percent- and 0.2-percent-annual-chance flood event.

Figure 4.3.4-3: FIRM Panel 42027C0368G, January 16, 2015 *(shows flood hazard areas along Spring Creek in Bellefonte, Benner, and Spring Townships)*

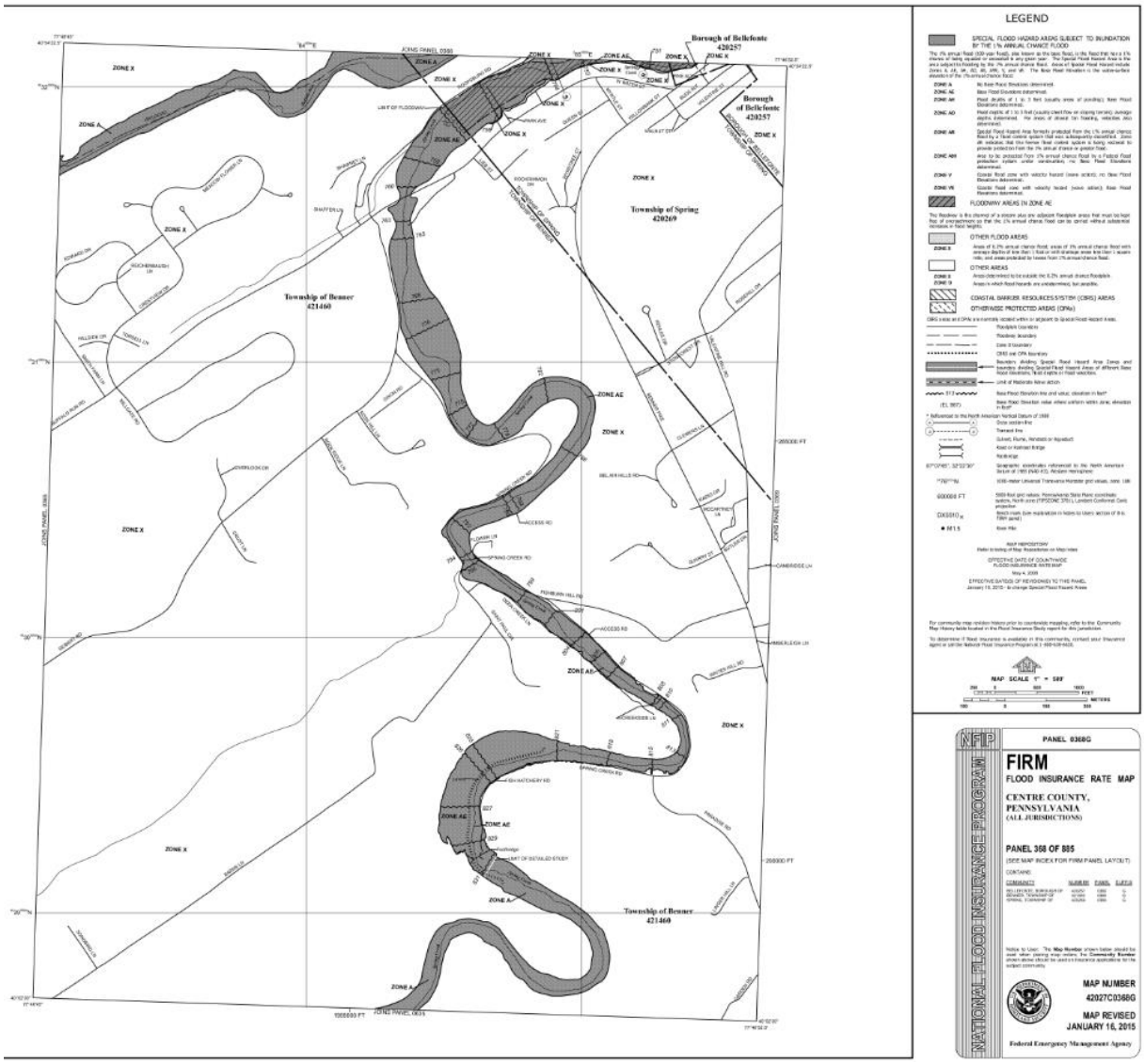
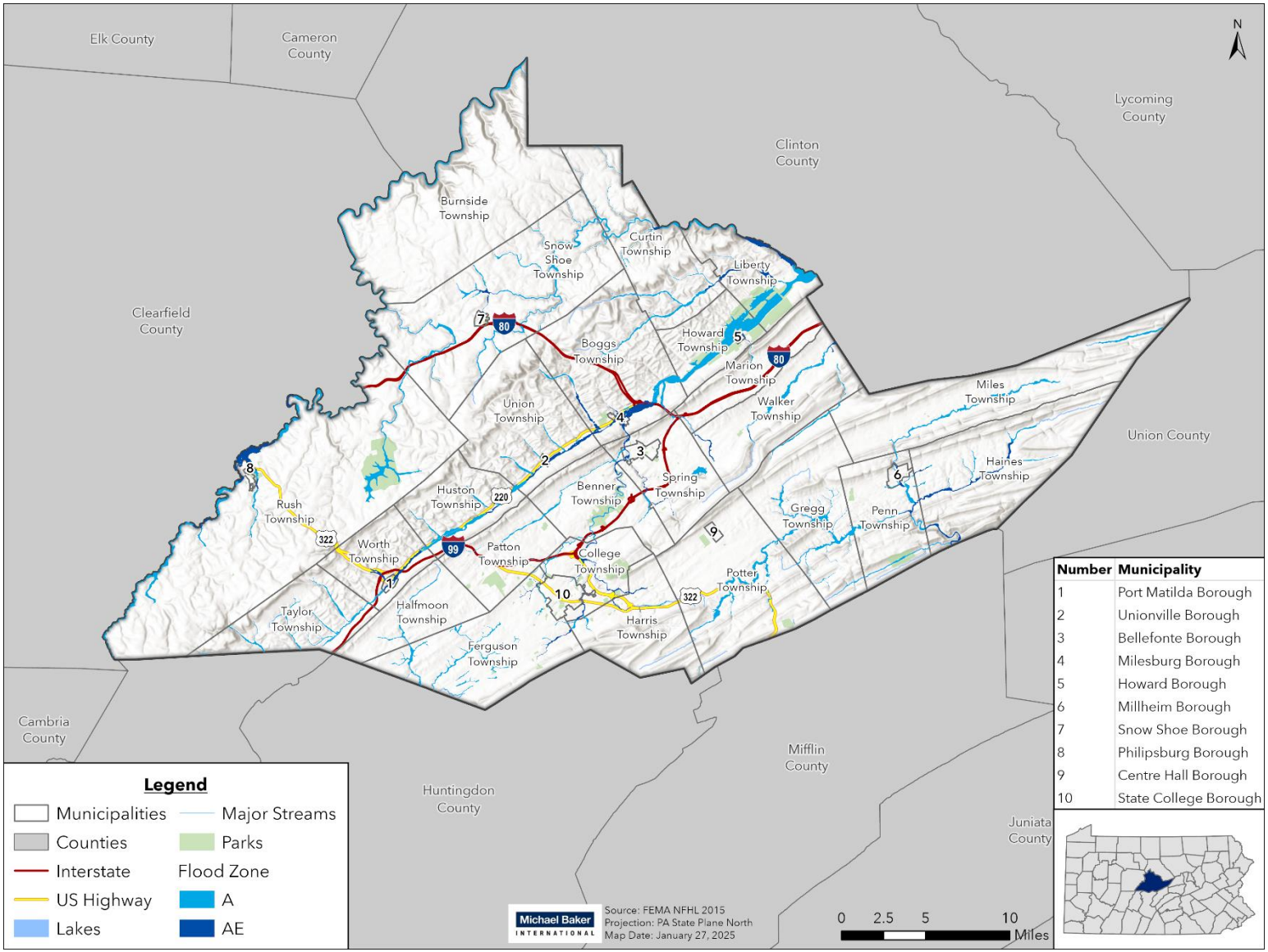


Figure 4.3.4-4 shows the location of approximate and detailed (includes BFEs) SFHAs in Centre County.

Figure 4.3.4-4: Special Flood Hazard Area in Centre County



The countywide FIS conducted by FEMA identifies areas of principal flood problems (FEMA, 2015). Spring Creek causes the majority of flooding within the county, impacting the municipalities of Bellefonte Borough, Milesburg Borough, Spring Township, and others. Milesburg Borough experiences flood issues as it is located at the confluence of Spring Creek with Bald Eagle Creek. Additionally, a power generator in Milesburg Borough is located in the 1-percent-annual-chance floodplain and is subject to flood inundation. Bridge obstruction during heavy rain and runoff on Moshannon Creek has resulted in flooding in the Philipsburg Area. Further, street flooding and sewage system backups occur in Philipsburg Borough and Rush Township when heavy rains overwhelm the storm water systems. Phantom Lake, located on both sides of State Route 64 near Pleasant Gap, is an unpredictable hydrologic phenomenon that appears and disappears quickly based on weather patterns. The Lake can occasionally cause problems for motorists along nearby roadways.

Major storms can cause localized inundation of structures along streams and creeks across the County including: Bald Eagle Creek, Beech Creek, Beaver Branch, Big Hollow Run, Black Moshannon Creek, Cedar Run No. 2, Cherry Run, Cold Stream, Council Run, Dewitt Run, Elk Creek, Galbraith Gap Run, Halfmoon Creek, Laurel Run, Lick Run, Little Fishing Creek, Little Marsh Creek, Little Sandy Run, Marsh Creek, Moose Run, Moshannon Creek, Nittany Creek, North Fork Beech Creek, Oliver Run, Penns Creek, Pine Creek, Piney Run, Roaring Run, Slab Cabin Run, South Fork Beech Creek, Spring Creek, Spruce Creek, Thompson Run, Wallace Run, Walnut Run, and Wolf Run.

It should also be noted that flooding is not only caused by heavy rain events. Additionally, as described in the Dam Failure Hazard Profile in Appendix G, Centre County has 10 high-hazard dams located within the County. If any one of these dams were to fail, there could be loss of life and property damage resulting from flooding within the dam inundation areas. Flood risk is also associated with levee failure. The United States Army Corps of Engineers (USACE) identifies six levee systems in Centre County through the National Levee Database (USACE, 2024).

4.3.4.2 Range of Magnitude

Flooding in Centre County has mainly been caused by heavy rainfall. Some areas have experienced rain events bringing more than three to as many as eight inches of rain to the area within a day. In September 2021, the eastern portion of Centre County was inundated with 5.5 inches of heavy rainfall that resulted in flooding (NCDC NOAA 2024). Climate Change threatens to alter precipitation patterns, which may worsen flooding extent within the county and beyond (FEMA 2024a). Temperature changes and humidity increases can shift the seasonal timing and intensity of precipitation and accelerate snowpack melting. Increased, record precipitation events can strain even the

most resilient stormwater infrastructure (NPS 2024). In Centre County, there are seasonal differences in how floods are caused. In the winter and early spring (February to April), major flooding has occurred as a result of heavy rainfall on dense snowpack throughout contributing watersheds, although the snowpack is generally moderate during most winters. Summer floods have occurred from intense rainfall on previously saturated soils. Summer thunderstorms deposit large quantities of rainfall over a short period of time that can result in flash flood events. In addition, as detailed in Section 4.3.5, the County occasionally experiences intense rainfall from tropical storms in late summer and early fall.

Floods are considered hazards when people and property are affected. Injuries and deaths can occur when people are swept away by flood currents or bacteria and disease are spread by moving or stagnant floodwaters. Most property damage results from inundation by sediment-filled water. A large amount of rainfall over a short time span can result in flash flood conditions. Small amounts of rain can result in floods in locations where the soil is frozen or saturated from a previous wet period or if the rain is concentrated in an area of impermeable surfaces such as large parking lots, paved roadways, or other impervious developed areas.

Several factors determine the severity of floods, including rainfall intensity and duration, topography, ground cover and rate of snowmelt. Additionally, Climate Change is expected to intensify the severity of flooding (NASA 2024). Water runoff is greater in areas with steep slopes and little or no vegetative ground cover. Centre County has sloping terrain near prominent ridges and in the western highlands, which can contribute to more severe floods as runoff reaches receiving water bodies more rapidly over steep terrain. Flooding can also be exacerbated through the process of urbanization. Increased development of impermeable surfaces in buildings and pavement or a lack of appropriately sized flood water detention basins leads to localized flooding.

The most severe flooding in Central Pennsylvania has been associated with the Susquehanna River Basin, which drains directly into the Chesapeake Bay and is the largest river basin on the Atlantic Coast. The greatest magnitude of countywide flooding impacts were reported as a result of Hurricane Agnes in 1972. During June 20-26, Hurricane Agnes dumped 9.64 inches of rain on Centre County, triggering record-setting, widespread flooding. In terms of localized property damage, the costliest flood event occurred in June 2013 as a result of flash flooding in the Centre Region from Pine Grove Mills in Ferguson Township through State College and in Bellefonte and Milesburg Boroughs. According to NOAA's NCEI, intense rains in the area resulted in $1.5 million worth of damage in Centre County. The area experienced numerous road

closings including portions of Routes 26, 3005, 45, and 550 with the area along Route 150 from Milesburg to Blanchard/Beech Creek near the Centre/Clinton County line being hardest hit. The Bald Eagle Creek at Beech Creek Station surged close to eight feet in four hours. A flood event of this magnitude can be considered a worst-case scenario for Centre County. Further details about this event and other significant flood events are found in Section 4.3.4.3.

Although floods can cause damage to property and loss of life, floods are naturally occurring events that benefit riparian systems. Such benefits include groundwater recharge and the introduction of nutrient rich sediment improving soil fertility (USDA 2024). However, the destruction of riparian buffers through development, changes to land use and land cover throughout a watershed, and the introduction of chemical or biological contaminants which often accompany human presence cause environmental harm when floods occur. Hazardous material facilities are potential sources of contamination during flood events. Other negative environmental impacts of flooding include water-borne diseases due to polluted drinking water, heavy siltation, damage or loss of crops, and drowning of both humans and animals (FEMA 2024a).

Dams, levees, and reservoirs act as flood protection measures. There are 41 dams in the County; however, 10 of these are high hazard dams. Please refer to the Dam Failure hazard profile in Appendix G for more information on dams. As previously mentioned, there are six levee systems in the County.

In addition to flood protections from dams and levees, protection measures have been built up through various regulations and physical projects across the County. A portion of the channel along Moshannon Creek has been straightened and minor channel improvements have been made along Bald Eagle Creek. Spring Township has an inundation ditch that diverts runoff from the southern portion of Pleasant Gap. It is approximately two feet deep and 10 feet wide. Additionally, local land use regulations adopted from the code of Federal Regulations, Title 24, Chapter 10, FIA, Parts 1910.3A and 1910.3B control building within areas that have high flood risk (FEMA, 2015). Centre County's 2021 Countywide Action Plan (CAP) includes broader goals to reduce current and future flooding impacts, such as addressing pollution resulting from agricultural activities in Bald Eagle Creek and Holt Run, restoring floodplains, and more (Centre County Conservation District, 2021).

The following community lifelines are affected by floods, flash floods, and ice jams:

Table 4.3.4-1: Most Likely Lifelines Impacted by Floods, Flash Foods, and Ice Jams

LIFELINES	NOTES
	Government operations and facilities, including police, fire, and search and rescue are needed for response and recovery.
	Significant risk to buildings is posed and can create issues for food and water access.
	Transportation routes will be affected due to direct damage from flooding and potential compounding hazards like landslides.
	Floods may affect hazardous materials storage due to damage to facilities.

4.3.4.3 Past Occurrence

Centre County has a long history of flooding events. Small, localized flooding events occur annually with minimal property damage. A total 12 of the 16 Presidential Disaster and Emergency Declarations affecting Centre County have been in response to flood hazard events. Flooding events, including those associated with Disaster Declarations, are listed in Table 4.2.1. From the table, the January 1996 flood is highlighted as representative of the usual type of damage that can occur within the County from a severe flood event. On January 19, 1996, unseasonably warm weather and heavy rains melted an 18-24" snowpack, causing extensive severe flooding throughout the County (PA DEP n.d.). Homes, businesses, roads, and bridges scattered throughout the County were damaged. The entire County came to a standstill during this period, causing Governor Ridge to declare a state of emergency and close all roads. This allowed road crews to work without the interruption of vehicular traffic and provided some reimbursements of municipal expenditures for infrastructure repairs.

Historically, the most devastating flood to hit Centre County resulted from Hurricane Agnes in 1972. During June 20-26, Hurricane Agnes dumped 7-18 inches of rain according to varying local reports. State College saw 8.5 inches of rain. The aftermath caused an estimated $2 billion in damages across the Susquehanna basin and fifty fatalities across the entire state (NOAA NWS 2024c). Specific damages include the following:

- More than 30 families were evacuated from Milesburg, where the West Penn Power Plant (now defunct) also flooded, causing widespread power outages over large areas.
- Homes on South Main Street and Harrison Road in Pleasant Gap were evacuated when it was feared Noll Dam would burst.
- 35 families were evacuated from the Woodsdale Mobile Home Park in State College.
- The Millbrook area was under water.
- Beech Creek overflowed, isolating people in Orviston and Monument
- Millheim was evacuated.
- About 75 Philipsburg families were forced from their homes and at least one business was severely damaged.
- Spring Creek spilled onto Water Street closing downtown Bellefonte and damaging several businesses along Potter and Water streets.
- A new playground was swept way in Port Matilda.
- Water rose above the causeway into Howard and overflowed the spillway of Sayers Dam.
- The Millheim Narrows disappeared under Pine Creek.
- Homes, businesses, and infrastructure were also damaged or lost in Houserville, Lemont, Julian, Pine Grove Mills, Howard, Axemann, Centre Hall, Boalsburg, Madisonburg, Aaronsburg, Woodward, Rebersburg, Spring Mills, and Bush Addition.

Pennsylvania State Police reported that almost all roadways in or out of the County closed. Even areas not near streams disappeared under storm runoff. At the end of the first week, County Commissioners estimated damages to businesses, homes, and public property, such as schools, municipal buildings, highways, and bridges, at $7.6 million, saying that number would go much higher as additional damages were discovered. Additionally, Penn State Cooperative Extension agents estimated that 40-50 percent of the hay crop, 30-40 percent of the small grain crop and 15 percent



Figure 4.3.4-4: Flooding along Fox Hollow Road in Patton Township, September 7, 2011 (Statecollege.com, 2011)

of the corn crop was lost. Prolonged cool temperatures and excess moisture impaired the quality of crops not listed as lost, resulting in further losses from a reduced market value.

The county also experienced severe flooding in October 2016 (NBC News 2016). Intense rainfall caused flash floods across region. Infrastructure damages on roadways, bridges, and culverts were assessed around $2 million. Over 20 swift water rescue teams were employed across the county.

Other flood and flash flood events have impacted Centre County to a lesser extent. Heavy rain caused flooding and a number of road closures throughout Centre County in March 2008. Roads were closed in the towns of Coburn and Milesburg, along with more roads in Boggs, College, Liberty, Penn, and Gregg Townships. As shown in Figures 4.3.4-5 and 4.3.4-6, Spring Creek Road in Bellefonte and Spring Creek Park in College Township experienced flooded during this heavy rain event. Countywide flooding in September 2011 and flash flooding in June 2014, June 2017, and August 2018 had similar impacts. The 2011 and 2014 events are shown in Figures 4.3.4-7 and 4.3.4-8.

Flood events, including those associated with Disaster Declarations, are listed in Table 4.3.4-1. Other information on previous flood events and historical losses can be found in Section 2.3 of the Centre County FIS. The NCEI data does not include an estimate of property damage for the effects of Hurricane Lee, which Centre County received an Emergency Disaster Declaration for; according to FEMA



Figure 4.3.4-5: Flooding in Boalsburg in June 2014 Pushed Rocks onto Linden Hall Road (Bauer, 2014)

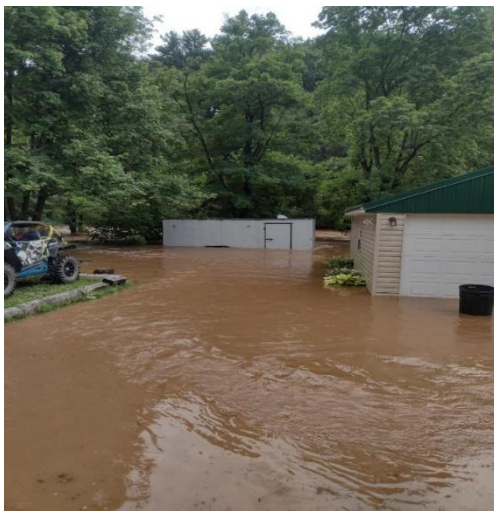


Figure 4.3.4-6: Flooding in Milesburg Borough in August 2024



Figure 4.3.4-7: Flooding in Unionville Borough in August 2024

Public Assistance records, 40 counties, including Centre, received over $495,000 in emergency work reimbursements due to the flooding from this storm.

In August 2024 heavy rains from the remnants of Tropical Storm Debby flooded Dewitt Run in Unionville Borough. Flooding impacted many houses, and significant response efforts were required from local officials.

Table 4.3.4-2: Flood, Flash Flood, and Heavy Rain Events Impacting Centre County from 1993-2024 (NCEI NOAA, 2024).

DATE	LOCATION & DESCRIPTION	EST. PROPERTY DAMAGE ($)
3/30/1993	Philipsburg. The retaining boards of the Cold Stream Recreation Dam gave way, impacting three homes in Philipsburg, with reported water damage. The bridge on Route 504 was also affected.	5,000
3/30/1993	Coburn/Spring Mills. Penns Creek reported 0.3 feet above flood stage, resulting in closure of Penns Creek Road.	Not Provided (NP)
4/16/1993	Curtin. Lowland and basement flooding observed. A swinging bridge damaged by high water from Marsh Creek.	5,000
11/28/1993	Countywide. Many small streams out of their banks, road closures reported at Penns Valley, Bald Eagle, and Coburn.	NP
8/2/1994	Countywide. Small stream flooding was observed.	NP
8/18/1994	Countywide. Small stream flooding was observed.	NP
8/25/1994	Woodward. Minor flooding observed.	NP
1/20/1995	Countywide. Small stream and poor drainage flooding.	NP
1/19/1996	Countywide. Flash flood.	NP
6/17/1996	State College. Over 5 inches of rain fell in two hours flooding roads and basements in State College. The State College High School suffered damage to classrooms on the lowest level and to the swimming pool. Several labs at Penn State also were damaged. Between 80 and 100 homes in the area sustained some damage.	NP
9/6/1996	Port Matilda. Route 220 closed due to flooding.	NP
11/8/1996	Phillipsburg. Basement and minor road flooding occurred due to heavy rains.	NP
12/1/1996	Countywide. Flash flood	NP
6/18/1997	State College. Flash flood.	NP
1/8/1998	Countywide. Flash flood.	NP

Table 4.3.4-2: Flood, Flash Flood, and Heavy Rain Events Impacting Centre County from 1993-2024 (NCEI NOAA, 2024).

DATE	LOCATION & DESCRIPTION	EST. PROPERTY DAMAGE ($)
4/26/1998	Countywide. Flash flood.	NP
1/23/1999	Countywide. Flash flood.	20,000
8/19/2001	State College. Slow moving thunderstorms caused Slab Cabin Run to rise out of its banks, with numerous reports of urban and poor drainage flooding were also noted.	NP
8/9/2003	Philipsburg. Numerous roadways in the area were quickly flooded from torrential thunderstorm rains.	NP
9/18/2003	Southern areas of the county. Heavy rain reported falling in southern portions of the State College county warning area (CWA). Rainfall amounts exceeded 3 inches in far southwestern areas, with much of the central CWA seeing in excess of 1 inch of rain.	NP
9/27/2003	Stormstown. Heavy rains caused flooding in Centre County. Road flooding was reported throughout the county. Hard hit were the intersections of Routes 220 and 550 in Stormstown, and portions of Julian Pike which were washed away by flood waters.	NP
11/19/2003	Port Matilda. Heavy rain caused rapid rises in streams, and produced flash flooding. This closed numerous roadways across the county, most notably roads in Port Matilda and Philipsburg.	NP
9/8/2004	Countywide. The remnants of Hurricane Frances moved northeast across central Pennsylvania from late Thursday afternoon on September 8th, into the early morning hours of Friday, September 9th, producing widespread heavy rainfall, and subsequent minor to moderate flooding. Rainfall amounts of 3 to 5 inches within a 12- to 18-hour period led to numerous road closures and widespread basement flooding across central Pennsylvania.	NP
9/17/2004	Countywide; As a result of this excessive rainfall from Hurricane Ivan and antecedent heavy rainfall from the remnants of Hurricane Frances one week earlier, widespread flooding occurred throughout central Pennsylvania from 9/17/2004 through 9/20/2004. Flood levels at many locations ranked in the top 5 for all flood events, with many river	NP

Table 4.3.4-2: Flood, Flash Flood, and Heavy Rain Events Impacting Centre County from 1993-2024 (NCEI NOAA, 2024).

DATE	LOCATION & DESCRIPTION	EST. PROPERTY DAMAGE ($)
	forecast points cresting above levels reached in the January 1996, flood. Overall, 32 of 47 river forecast points exceeded flood stage in central Pennsylvania, an all-time record high water mark, at Bald Eagle Creek at Beech Creek Station. The widespread flooding closed hundreds of roads and bridges across central Pennsylvania, causing a significant adverse impact on commerce and transportation for several days. Preliminary monetary estimates of flood damage from the remnants of Ivan across the state were over 260 million dollars.	
11/16/2006	State College. A strong cold front crossing the region triggered widespread severe weather and flash flooding across Central Pennsylvania. In State College, small streams came out of their banks, closing numerous roads and flooding basements.	NP
3/4/2008	Numerous locations. Heavy rain caused flooding and a number of road closures throughout Centre County. Roads were closed in the towns of Coburn and Milesburg, along with more roads in Boggs, College, Liberty, Penn, and Gregg Townships.	NP
12/1/2010	Countywide. Rainfall amounts between 2 and 4 inches produced significant flooding. The flooding closed several state, county and municipal roads in Howard, Curtin, Liberty, Potter, and Gregg Townships. The Borough of Milesburg declared a state of emergency and evacuated several residents from the Eagle Creek Trailer Park. The major flooding at confluence of Bald Eagle Creek and Moose Run caused extensive flooding in Milesburg. Unionville and Julian were also hit hard by the flooding. Numerous businesses and homes were affected in downtown Milesburg. U.S. Alternate 220 was closed from Skytop Mountain to Unionville. SR 45 westbound from Pine Grove Mills and Dogtown Road in Potter Township were closed. Water rescues were performed along South Eagle Valley Road in Huston Township. Spring Creek in Houserville came out of its banks and flooded nearby areas.	200,000

Table 4.3.4-2: Flood, Flash Flood, and Heavy Rain Events Impacting Centre County from 1993-2024 (NCEI NOAA, 2024).

DATE	LOCATION & DESCRIPTION	EST. PROPERTY DAMAGE ($)
3/10/2011	Countywide. Heavy rain produced flooding and road closures over portions of the county.	NP
9/7/2011	Countywide. In Milesburg Borough, a trailer park and several roads were closed to flooding. Sporadic flooding was reported along Alt 220 along Bald Eagle Creek between Milesburg and Port Matilda.	NP
9/27/2011	Countywide. Thunderstorms caused flash flooding in portions of downtown State College. One foot of water was reported on portions of Atherton Street.	NP
6/27/2013	Countywide. Torrential rains produced flash flooding in the Centre region from Pine Grove Mills and State College through Bellefonte and Milesburg. The hardest hit area was from Milesburg northeast along Route 150 to the Blanchard/Beech Creek Area near the Centre/Clinton county line. Numerous roads were closed as a result of the event.	1,500,000
6/27/2013	Countywide. Flash flooding around the Centre region transitioned to areal flooding during the evening. The flood waters receded before midnight.	NP
7/10/2013	Countywide. Heavy thunderstorm rains caused flash flooding around State College. A few vehicles were stranded in standing water on Atherton Street near the bus terminal. This section of Atherton Street was briefly impassable. Thompson Run came out of its banks and closed the eastbound lane of College Avenue in front of the Your Building Center.	NP
8/1/2014	Countywide. Flash flooding prompted road closures due to high water including the eastbound lanes of College Avenue adjacent to Thompson Run in front of the Blaise Alexander auto dealership, Atherton Street from Park Avenue to College Avenue and Orchard Road between Park Avenue and Puddintown Road. A few cars were stranded in the flood waters.	NP

Table 4.3.4-2: Flood, Flash Flood, and Heavy Rain Events Impacting Centre County from 1993-2024 (NCEI NOAA, 2024).

DATE	LOCATION & DESCRIPTION	EST. PROPERTY DAMAGE ($)
10/20/2016	Countywide. Intense rainfall led to flash floods across Centre County. Up to 8 inches of rain fell overnight in the 21st, causing major damage in the area. Infrastructure damages were assessed at around $2 million, impacting roadways, bridges, and culverts. Additionally, flooding resulted in school closures. Over 20 swift water rescue teams responded across the county, including Bald Eagle Creek in Milesburg. Additionally, a recent regional drought left soil unstable. This event resulted in widespread erosion and debris flow on agricultural lands.	$5,000,000
6/16/2017	Walker Township. Scattered thunderstorms resulted in localized flash flooding in the County. Zion Back Road in Walker Township was impacted by this event.	NP
8/3/2018	Countywide. Heavy rain led to flash flooding in the State College area. There were numerous road closures, including Benner Pike, Buffalo Run Road, Fox Hollow Road, Rock Road, West Pine Grove, and portions of East College Avenue.	NP
9/23/2021	Eastern parts of Centre affected. Heavy rain caused flooding. Road closures in Bellefonte, Boalsburg, Park Forest Village, State College, Woodward, Pleasant Gap, Stormstown, Lemont, Zion, Belleville, Houserville, Mill Hall, Pine Grove Mills, Milesburg, Coburn, Elk Creek, and Penns Creek.	NP
7/28/2023	Countywide. Thunderstorms caused flooding and sporadic wind damage. Portion of Route 53 in Philipsburg closed due to flooding. Three to four vehicles became immobilized in standing water.	NP

Note that property damage values are estimates based on best available information.
"Countywide" indicates several locations in the County were affected.
Note that events from 1996 to present were recorded on the NOAA-NCEI Storm Events Database.

Figure 4.3.4-9 illustrates the locations of ice jams in Centre County as documented in the USACE Ice Jam Database. Figure 4.3.4-10 depicts the location of NWS flash flood reports.

Figure 4.3.4-8: Location of Ice Jam Reports in Centre County (1941-2024)

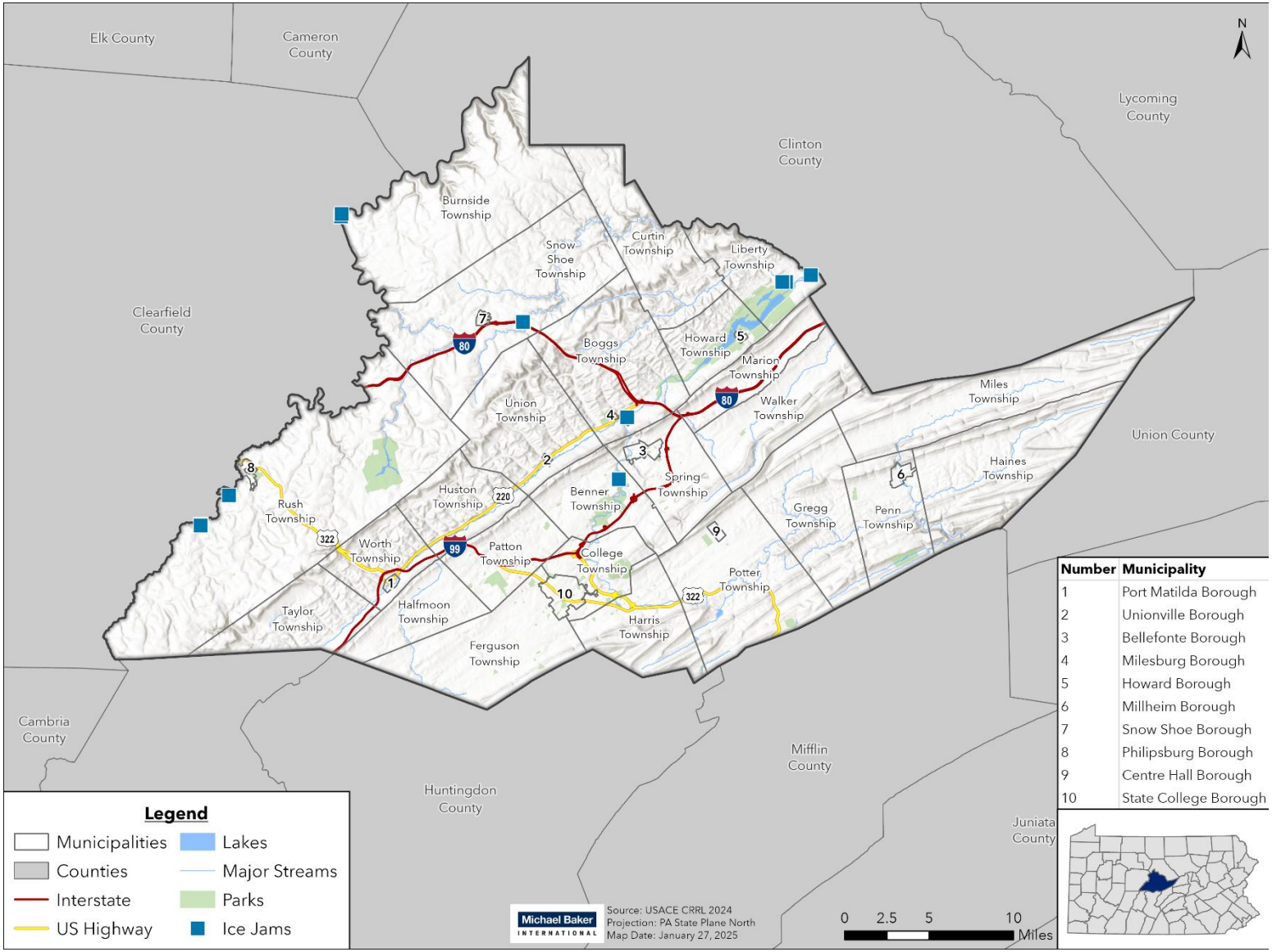
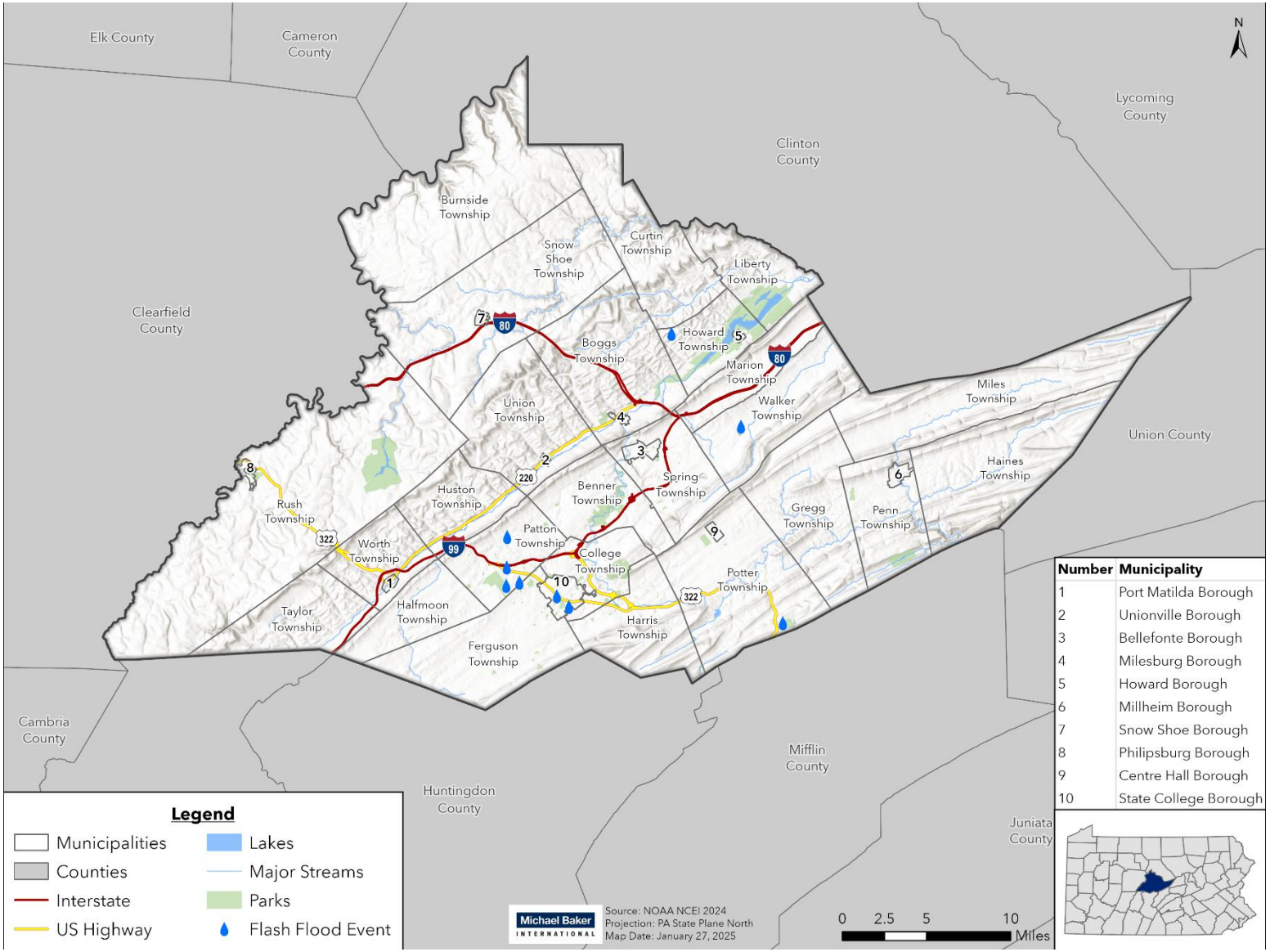


Figure 4.3.4-9: Location of Flash Flood Reports in Centre County, 2006-2024



The NFIP identifies properties that frequently experience flooding. Floods are the most common and costly natural catastrophe. In terms of economic disruption, property damage, and loss of life, floods are "nature's number-one disaster." For that reason, flood insurance is almost never available under industry-standard homeowner's and renter's policies. The best way for citizens to protect their property against loss to flood is to purchase flood insurance through the NFIP.

Since 1983, the chief means of providing flood insurance coverage has been a cooperative venture of FEMA and the private insurance industry known as the Write Your Own (WYO) Program. This partnership allows qualified property and casualty insurance companies to "write" (that is, issue) and service the NFIP's Standard Flood Insurance Policy under their own names.

Today, nearly 48 WYO insurance companies issue and service the NFIP under their own names (FEMA, 2024b). More than 4.6 million federal flood insurance policies are in force. These policies represent over 1.2 trillion in flood insurance coverage for homeowners, renters, and business owners throughout the United States and its territories (FEMA, 2024c). As of May 2024, Pennsylvania had a total of 2,701 policies in force across the state, 297 of which were in Centre County (FEMA CIS, 2024).

The NFIP provides flood insurance to individuals in communities that are members of the program. Membership in the program is contingent on the community adopting and enforcing floodplain management and development regulations. The NFIP is based on the voluntary participation of communities of all sizes. In the context of this program, a "community" is a political entity – whether an incorporated city, town, township, borough, or village, or an unincorporated area of a county or parish – that has legal authority to adopt and enforce floodplain management ordinances for the area under its jurisdiction.

National Flood Insurance is available only in communities that apply for participation in the NFIP and agree to implement prescribed flood mitigation measures. Newly participating communities are admitted to the NFIP's Emergency Program. Most of these communities quickly earn "promotion" to the Regular Program.

The Emergency Program is the initial phase of a community's participation in the NFIP. In return for the local government's agreeing to adopt basic floodplain management standards, the NFIP allows local property owners to buy modest amounts of flood insurance coverage. In return for agreeing to adopt more comprehensive floodplain management measures, an Emergency Program community can be "promoted" to the Regular Program. Local policyholders immediately become eligible to buy greater amounts of flood insurance coverage. All participating municipalities in Centre County are in the Regular Program.

The minimum floodplain management requirements include:

- Review and permit all development in the SFHA;
- Elevate new and substantially improved residential structures at or above the base flood elevation;
- Elevate or dry floodproof new and substantially improved non-residential structures;
- Limit development in floodways;
- Locate or construct all public utilities and facilities to minimize or eliminate flood damage; and
- Anchor foundation or structure to resist floatation, collapse, or lateral movement.

Table 4.3.4-3 below indicates municipal participation in the NFIP.

Table 4.3.4-3: Centre County Municipal Participation in the NFIP (FEMA CIS, 2024b)

COMMUNITY	PARTICIPATION STATUS	CID	INITIAL FIRM IDENTIFIED	CURRENT EFFECTIVE MAP DATE
Bellefonte Borough	Participating	420257	2/2/1977	1/16/2015
Benner Township	Participating	421460	6/5/1989	1/16/2015
Boggs Township	Participating	421193	8/15/1989	5/4/2009
Burnside Township	Participating	421461	1/17/1986	5/4/2009
Centre Hall Borough	Participating	420258	5/4/2009	5/4/2009
College Township	Participating	420259	7/4/1989	5/4/2009
Curtin Township	Participating	421462	6/5/1989	5/4/2009
Ferguson Township	Participating	420260	7/17/1989	5/4/2009
Gregg Township	Participating	421194	11/2/1984	5/4/2009
Haines Township	Participating	420261	8/1/1978	5/4/2009
Halfmoon Township	Participating	421463	10/13/1978	5/4/2009
Harris Township	Participating	420262	6/5/1989	5/4/2009
Howard Borough	Participating	420263	8/3/1989	1/16/2015
Howard Township	Participating	421464	8/3/1989	1/16/2015
Huston Township	Participating	421195	6/5/1989	5/4/2009
Liberty Township	Participating	421196	6/5/1989	1/16/2015
Marion Township	Participating	421465	11/2/1984	1/16/2015
Miles Township	Participating	421197	12/4/1985	5/4/2009
Milesburg Borough	Participating	420264	2/2/1977	5/4/2009
Millheim Borough	Participating	420265	6/5/1989	5/4/2009
Patton Township	Participating	420266	2/19/1986	5/4/2009
Penn Township	Participating	421466	10/17/1989	5/4/2009

Table 4.3.4-3: Centre County Municipal Participation in the NFIP (FEMA CIS, 2024b)

COMMUNITY	PARTICIPATION STATUS	CID	INITIAL FIRM IDENTIFIED	CURRENT EFFECTIVE MAP DATE
Philipsburg Borough	Participating	420267	08/15/1990	5/4/2009
Port Matilda Borough	Participating	420268	11/03/1989	5/4/2009
Potter Township	Participating	421467	02/05/1986	5/4/2009
Rush Township	Participating	421468	11/16/1990	5/4/2009
Snow Shoe Borough	Participating	421459	08/10/1979	5/4/2009
Snow Shoe Township	Participating	421198	06/19/1989	5/4/2009
Spring Township	Participating	420269	04/15/1977	1/16/2015
State College Borough	Participating	420270	06/30/1976	5/4/2009
Taylor Township	Participating	421469	01/03/1986	5/4/2009
Union Township	Participating	421470	07/17/1989	5/4/2009
Unionville Borough	Participating	420272	11/03/1989	5/4/2009
Walker Township	Participating	421471	07/17/1989	5/4/2009
Worth Township	Participating	421472	08/15/1989	5/4/2009

In addition, Regular Program communities are eligible to participate in the NFIP's Community Rating System (CRS). As of October 1, 2023, Penn and Union Townships are eligible for participation (FEMA CRS, 2023). Under the CRS, policyholders can receive premium discounts of 5 to 45 percent as their cities and towns adopt more comprehensive flood mitigation measures. No communities in Centre County are currently participating in the CRS.

Information on NFIP premiums and coverage, prior claims, and substantial damage claims provide additional information on past flood occurrences. Table 4.3.4-4 shows this information for each community in Centre County.

Table 4.3.4-4: Centre County NFIP Polices and Claims Information (FEMA CIS, 2024a) (FEMA CIS, 2024b)

COMMUNITY	POLICIES IN FORCE	TOTAL PREMIUM AND COVERAGE	PRIOR CLAIMS	TOTAL AMOUNT OF PAID CLAIMS	SUBSTANTIAL DAMAGE CLAIMS
Bellefonte Borough	3	$809,000	18	$1,020,684	1
Benner Township	3	$514,000	6	$8,814	0
Boggs Township	24	4,804,000	20	$49,672	0
Burnside Township	0	$0	5	$11,035	0
Centre Hall Borough	0	$0	2	$0	0

Table 4.3.4-4: Centre County NFIP Polices and Claims Information (FEMA CIS, 2024a) (FEMA CIS, 2024b)

COMMUNITY	POLICIES IN FORCE	TOTAL PREMIUM AND COVERAGE	PRIOR CLAIMS	TOTAL AMOUNT OF PAID CLAIMS	SUBSTANTIAL DAMAGE CLAIMS
College Township	12	3,870,000	32	$378,208	2
Curtin Township	3	$515,000	2	$13,698	0
Ferguson Township	10	$2,661,000	9	$43,786	0
Gregg Township	5	$1,009,000	19	$82,510	0
Haines Township	3	$610,000	11	$4,498	0
Halfmoon Township	4	$895,000	0	$0	0
Harris Township	4	$1,166,000	8	$9,108	0
Howard Borough	0	$0	0	$0	0
Howard Township	1	$250,000	0	$0	0
Huston Township	3	$317,000	2	$0	0
Liberty Township	8	$724,000	11	$41,549	0
Marion Township	0	$0	0	$0	0
Miles Township	0	$0	0	$0	0
Milesburg Borough	17	$2,470,000	59	$528,285	4
Millheim Borough	6	$610,000	11	$95,020	2
Patton Township	9	$2,917,000	5	$18,856	0
Penn Township	3	$294,000	46	$244,684	3
Philipsburg Borough	10	$1,528,000	21	$31,889	0
Port Matilda Borough	3	$648,000	2	$4,339	0
Potter Township	3	$780,000	8	$25,626	0
Rush Township	15	$2,403,000	27	$196,325	1
Snow Shoe Borough	0	$0	2	$2,427	0
Snow Shoe Township	4	$738,000	0	$0	0
Spring Township	20	$5,857,000	18	$96,268	0
State College Borough	11	$3,256,000	5	$221,141	1
Taylor Township	4	$1,078,000	0	$0	0
Union Township	2	$700,000	3	$25,780	0
Unionville Borough	1	$15,000	5	$7,091	0
Walker Township	4	$776,000	7	$9,877	0
Worth Township	3	$1,500,000	0	$0	0
Total	**198**	**$43,714,000**	**364**	**$3,171,170**	**14**

In addition to the past flood events, the NFIP identifies properties that experience frequent flooding and can be used to determine areas of higher risk. These properties are identified through the NFIP when they receive more than one payment for flood damages. The NFIP defines a Repetitive Loss (RL) property as "any insurable building for which two or more claims of more than $1,000 were paid by the NFIP within any rolling ten-year period, since 1978." The RL data provided in Table 4.3.4-4 and throughout this Plan Update represents the NFIP's definition of RL.

With respect to obtaining mitigation funding, FEMA's Hazard Mitigation Assistance (HMA) grant programs define a RL property as a structure that:

- Is covered by a contract for flood insurance made available under the NFIP; and
- Has incurred flood-related damage on two occasions, in which the cost of the repair, on the average, equaled or exceeded 25 percent of the market value of the structure at the time of each such flood event; and
- At the time of the second incidence of flood-related damage, the contract for flood insurance contains increased cost of compliance coverage (ICC). (Note: Homes are eligible for ICC coverage after the first loss, however the cost for ICC is part of all policies.)

Under FEMA's HMA grant programs, a Severe Repetitive Loss property is a structure that:

- Is covered under a contract for flood insurance made available under the NFIP; and
- Has incurred flood related damage (i) For which four or more separate claims payments have been made under flood insurance coverage with the amount of each such claim (including building and contents payments) exceeding $5,000, and with the cumulative amount of such claims payments exceeding $20,000; or (ii) For which at least two separate claims payments have been made under such coverage, with the cumulative amount of such claims exceeding the market value of the insured structure.

As of April 2024, there were 22 repetitive loss properties in Centre County, with four located in College Township. There are no severe repetitive loss buildings in Centre County (FEMA, 2024a). Table 4.3.4-5 shows the number of repetitive loss properties by municipality.

Table 4.3.4-5: Summary of the Number and Type of Repetitive Loss Properties by Municipality (FEMA, 2024a)

MUNICIPALITY	TYPE			SUM OF REPETITIVE LOSS PROPERTIES
	2-4 FAMILY	NON-RESIDENTIAL	SINGLE FAMILY	
Bellefonte Borough	0	1	1	2
Benner Township	0	0	1	1
Boggs Township	0	1	1	2
College Township	0	0	4	4
Gregg Township	1	0	0	1
Milesburg Borough	0	1	3	4
Millheim Borough	0	0	1	1
Penn Township	1	0	2	3
Potter Township	0	0	1	1
Spring Township	0	0	2	2
State College Borough	0	1	0	1
Total	**2**	**4**	**16**	**22**

Data on the specific types on "non-residential" structures could not be obtained, but it is assumed to include primarily, but not be limited to, commercial and industrial structures. The majority of repetitive loss properties are single family residential structures.

4.3.4.4 Future Occurrence

In this plan, the term "Special Flood Hazard Area" is used rather than floodplain to clarify that the area under considerations is identified on the FIRM as having at least a 1-percent chance of flooding in any given year. Historically, the area with a 1-percent chance of flooding in any given year has been called the "100-year floodplain" or the "base flood" and the area with a 0.2-percent chance of flooding in any given year has been called the "500-year floodplain." As these terms can be misleading by suggesting that there will be a flood only every 100 or 500 years respectively, they are not used in this plan. The 1- and 0.2- percent-annual-chance-floods are delineated on the Centre County FIRM. Areas subject to 2 percent- and 10 percent-annual-chance-events are not shown on FIRMs, however, water surface elevations associated with these events are included in the flood source profiles contained in the FIS Report. The most recent FIS for each county in Pennsylvania is available from the FEMA Map Service Center (http://www.msc.fema.gov). Table 4.3.4-6 shows a range of flood recurrence intervals and associated probabilities of occurrence.

Table 4.3.4-6: Recurrence Intervals and Associated Probabilities of Occurrence (USGS, 2024)

RECURRENCE INTERVAL	CHANCE OF OCCURRENCE IN ANY GIVEN YEAR (%)
10 year	10
50 year	2
100 year	1
500 year	0.2

In Centre County, flooding occurs commonly and can take place during any season of the year. However, the possibility of flooding is greatly reduced during the winter months. Although most severe floods are attributable to rainfall alone, the spring floods can be compounded by snowmelt and moving ice. The major floods in the late summer and fall are often associated with tropical storms moving up the Atlantic coastline. Within the flood-susceptible areas in Centre County, it is expected that the character of flooding will remain essentially unchanged from what has been experienced for many years. However, some increase in the severity and frequency of flooding may result due to planned or recent development within the floodplains of the various streams, as well as increased intensity and frequency of rain events. Therefore, the future occurrence of floods in Centre County can be characterized as *likely* as defined by the Risk Factor Methodology probability criteria (see Table 4.4.1-1).

Changing climates are increasing the frequency and magnitude of flood events. The Fourth National Climate Assessment identified more flooding occurring in the Northeast Region (US GCRP, 2018). Increasing temperatures are linked to increasing amounts and intensity of precipitation, which could increase frequency and severity of flood events. Climate Central projects that areas near State College could experience precipitation events about twice as hazardous by 2050 (Climate Central, 2019).

The Climate Mapping for Resilience and Adaptation (CRMA) Tool provides a county-level assessment report for flooding, shown in Figure 4.3.4-11 below. According to CRMA, the average annual precipitation is expected to increase while the number of days per year with precipitation may decrease. The annual days that exceed the 99th percentile precipitation is projected to increase as well. Lastly, the number of days with a maximum temperature below 32 degrees Fahrenheit is projected to decrease. These projections combine to show that future precipitation may be more intense and during the winter months it will be less likely to turn into snow.

Figure 4.3.4-3: Centre County Flooding Hazard Assessment Report (CRMA, 2024)



Future Climate Indicators

Indicator	Modeled History (1976 - 2005)	Early Century (2015 - 2044)		Mid Century (2035 - 2064)		Late Century (2070 - 2099)	
		Lower Emissions	Higher Emissions	Lower Emissions	Higher Emissions	Lower Emissions	Higher Emissions
	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
Precipitation:							
Annual average total precipitation	**41"** 40 - 43	**43"** 41 - 47	**44"** 41 - 47	**44"** 41 - 49	**44"** 40 - 48	**44"** 41 - 49	**46"** 42 - 50
Days per year with precipitation (wet days)	**208 days** 205 - 214	**206 days** 194 - 217	**206 days** 191 - 215	**206 days** 193 - 219	**205 days** 187 - 216	**205 days** 191 - 214	**202 days** 174 - 226
Maximum period of consecutive wet days	**13 days** 12 - 14	**13 days** 12 - 15	**13 days** 12 - 16	**13 days** 12 - 16	**13 days** 12 - 17	**13 days** 12 - 16	**14 days** 11 - 21
Annual days with:							
Annual days with total precipitation > 1inch	**3 days** 3 - 4	**4 days** 3 - 5	**4 days** 3 - 5	**4 days** 3 - 5	**5 days** 3 - 6	**5 days** 4 - 6	**6 days** 4 - 7
Annual days with total precipitation > 2 inches	**0 days** 0 - 0	**0 days** 0 - 1	**0 days** 0 - 0	**0 days** 0 - 1	**0 days** 0 - 1	**0 days** 0 - 1	**1 days** 0 - 1
Annual days with total precipitation > 3 inches	**0 days** 0 - 0	**0 days** 0 - 0	**0 days** 0 - 0	**0 days** 0 - 0	**0 days** 0 - 0	**0 days** 0 - 0	**0 days** 0 - 0
Annual days that exceed 99th percentile precipitation	**5 days** 4 - 6	**6 days** 5 - 7	**6 days** 5 - 8	**6 days** 5 - 8	**7 days** 6 - 8	**7 days** 6 - 9	**8 days** 7 - 10
Days with maximum temperature below 32 °F	**39 days** 36 - 41	**29 days** 16 - 38	**28 days** 20 - 38	**25 days** 13 - 36	**23 days** 14 - 35	**22 days** 9 - 34	**14 days** 4 - 27

N/A = Data Not Available for the selected area

4.3.4.5 Vulnerability Assessment

Centre County is vulnerable to flooding that causes loss of lives, property damage, and road closures. For purposes of assessing vulnerability, the County focused on community assets that are located in the 1-percent-annual-chance floodplain. While greater and smaller floods are possible, information about the extent and depths for this floodplain is available for all municipalities countywide, thus providing a consistent basis for analysis. Flood vulnerability maps for each local municipality showing the 1-percent-annual-chance flood hazard area, critical facilities impacted, and transportation routes are included in Appendix D - Local Municipality Flood Vulnerability Maps.

Table 4.3.4-7 displays the number of addressable structures, critical facilities, and populations intersecting the SFHA along with the total number of addressable structures, critical facilities, and population in each municipality. The critical facilities in this table excludes conventional and unconventional oil and gas wells. Due to the volume of wells in the County, the vulnerability of these facilities is analyzed independently as shown in Table 4.3.4-9. The numbers of vulnerable addressable structures and critical facilities were calculated by overlaying the addressable structures with the SFHA as shown on the FIRM. Similarly, the estimated population in the SFHA was calculated by overlaying the centroids of Census blocks with the SFHA; while this is an estimate, using the block centroid helps to minimize overestimation of flood-prone populations.

Overall, four percent of the addressable structures and 28 percent of the population of Centre County are most at risk to the 1-percent-annual-chance flood zone. Liberty Township and Boggs Township have the highest number of addressable structures in the SFHA with 390 and 385 structures respectively, followed by Rush Township, which has 337 flood prone structures. Milesburg Borough has the highest percentage of structures (32 percent) in the SFHA. Based on this analysis, 13 of 35 Centre County communities have more than 50 percent of their populations living in the SFHA:

- Curtin Township (96%)
- Gregg Township (90%)
- Taylor Township (88%)
- Huston Township (85%)
- Penn Township (81%)
- Union Township (79%)
- Millheim Borough (68%)
- Boggs Township (65%)
- Howard Township (63%)
- Haines Township (62%)
- Liberty Township (59%)
- Milesburg Borough (57%)
- Snowshoe Township (52%)

In the 2021 HMP, four municipalities had critical facilities located in the SFHA. Analyses for this Plan Update show that 21 municipalities have critical facilities (excluding oil and gas wells) located in the SFHA. Critical facilities in the SFHA primarily include dams and sewer and water treatment plants. There are also four congregate care facilities, two daycares, two EMS stations, two medical facilities and two miscellaneous facilities in the SFHA. If not already implemented, these facilities could be considered for flood protection measures to protect emergency response efforts during events. FAs previously noted, unconventional and conventional oil and gas wells are considered critical facilities in this plan, but the vulnerability of these wells are analyzed separately (Table 4.3.4-9).

Table 4.3.4-8 shows the number of structures in the SFHA by generalized land use type. Most vulnerable structures (2,617) are residential properties, followed by agriculture (348), commercial (232), and recreation (211). Floods also have a significant impact on agricultural crops; especially vulnerable communities with extensive farmlands. Not only are crops lost in the immediate flood event, but often the remaining crops are of lesser quality, resulting in further losses. Additionally, there is the cost of replacing livestock feed lost to flooding. Because of the 1972 Agnes Flood, many industries and residents have prepared emergency plans, and some have established flood proofing procedures.

Table 4.3.4-7: Community Flood Vulnerability in Centre County, 2024

MUNICIPALITY	TOTAL STRUCTURES	TOTAL STRUCTURES IN SFHA	PERCENT STRUCTURES IN SFHA	TOTAL CRITICAL FACILITIES	CRITICAL FACILITIES IN SFHA	PERCENT CRITICAL FACILITIES IN SFHA	TOTAL ESTIMATED 2020 POPULATION	POPULATION IN SFHA	PERCENT POPULATION IN SFHA
Bellefonte Borough	3,608	70	2%	21	4	19%	6102	366	6%
Benner Township	4,185	104	2%	26	-	0%	8963	1,623	18%
Boggs Township	3,300	385	12%	8	2	25%	2,714	1,751	65%
Burnside Township	753	10	1%	3	-	0%	411	94	23%
Centre Hall Borough	1,006	0	0%	5	-	0%	1,269	-	0%
College Township	6,214	68	1%	42	2	5%	10,718	2,917	27%
Curtin Township	1,055	177	17%	2	1	50%	494	475	96%
Ferguson Township	9,125	108	1%	34	1	3%	18,949	8,347	44%
Gregg Township	3,131	315	10%	15	6	40%	2,261	2,024	90%
Haines Township	2,580	144	6%	10	1	10%	1,649	1,020	62%
Halfmoon Township	2,148	30	1%	9	-	0%	2,790	936	34%
Harris Township	3,803	17	0%	11	2	18%	5,913	2,074	35%
Howard Borough	587	8	1%	9	-	0%	687	146	21%
Howard Township	1,141	38	3%	6	-	0%	875	551	63%
Huston Township	1,594	165	10%	2	-	0%	1,317	1,123	85%
Liberty Township	2,430	390	16%	6	1	17%	1,815	1,078	59%
Marion Township	1,346	7	1%	5	-	0%	1,182	280	24%
Miles Township	2,770	47	2%	13	-	0%	1,998	746	37%
Milesburg Borough	859	278	32%	7	3	43%	1,084	623	57%
Millheim Borough	840	168	20%	2	-	0%	831	563	68%
Patton Township	6,567	21	0%	24	-	0%	15,650	3,655	23%
Penn Township	1,786	228	13%	17	3	18%	1,203	978	81%

Table 4.3.4-7: Community Flood Vulnerability in Centre County, 2024

MUNICIPALITY	TOTAL STRUCTURES	TOTAL STRUCTURES IN SFHA	PERCENT STRUCTURES IN SFHA	TOTAL CRITICAL FACILITIES	CRITICAL FACILITIES IN SFHA	PERCENT CRITICAL FACILITIES IN SFHA	TOTAL ESTIMATED 2020 POPULATION	POPULATION IN SFHA	PERCENT POPULATION IN SFHA
Philipsburg Borough	1,811	94	5%	12	2	17%	2,772	614	22%
Port Matilda Borough	458	40	9%	4	-	0%	578	226	39%
Potter Township	4,648	65	1%	15	1	7%	3,580	1,260	35%
Rush Township	4,587	337	7%	26	4	15%	3,513	1,418	40%
Snow Shoe Borough	595	-	0%	3	-	0%	670	23	3%
Snow Shoe Township	2,677	87	3%	6	2	33%	1,621	849	52%
Spring Township	6,153	176	3%	30	2	7%	7,980	3,920	49%
State College Borough	7,332	20	0%	42	1	2%	40,605	1,111	3%
Taylor Township	1,281	90	7%	1	-	0%	848	750	88%
Union Township	1,865	114	6%	7	2	29%	1,363	1,076	79%
Unionville Borough	264	33	13%	1	1	100%	271	88	32%
Walker Township	4,311	108	3%	12	1	8%	4,599	1,936	42%
Worth Township	1,059	9	1%	3	1	33%	725	354	49%
Total	**97,869**	**3,951**	**4%**	**439**	**43**	**10%**	**158,000**	**44,995**	**28%**

Table 4.3.4-8: Structures Vulnerable to Flooding (in SHFA) by Municipality and Land Use Type in Centre County, 2024

MUNICIPALITY	TOTAL STRUCTURES	STRUCTURES IN THE SFHA																
		AGRICULTURE	COMMERCIAL	COMMUNICATIONS	FORESTS	INDUSTRIAL	MINED LAND	MIXED USE	PUBLIC/SEMI-PUBLIC	RECLAIMED LAND	RECREATION	RESIDENTIAL	TRANSPORTATION	UTILITY	VACANT LAND	VACANT STRUCTURE	WATER	TOTAL
Bellefonte Borough	3,608	-	11	-	-	19	-	-	15	-	1	17	1	1	2	3	-	70
Benner Township	4,185	13	5	-	7	-	-	-	35	-	3	38	-	2	1	-	-	104
Boggs Township	3,300	33	40	-	9	7	-	4	13	-	11	257	-	8	2	-	1	385
Burnside Township	753	-	-	-	2	-	-	-	-	-	-	7	-	1	-	-	-	10
Centre Hall Borough	1,006	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
College Township	6,214	7	-	-	3	-	-	-	5	-	3	37	-	5	8	-	-	68
Curtin Township	1,055	23	-	-	2	-	1	-	3	-	-	145	-	-	3	-	-	177
Ferguson Township	9,125	22	6	-	2	2	-	-	1	-	2	67	3	2	1	-	-	108
Gregg Township	3,131	42	5	-	2	1	-	13	14	-	5	216	-	2	4	10	1	315
Haines Township	2,580	34	1	-	6	-	-	-	2	-	22	79	-	-	-	-	-	144
Halfmoon Township	2,148	11	-	-	2	-	-	-	-	-	-	16	-	-	1	-	-	30
Harris Township	3,803	1	-	-	-	-	-	-	-	-	2	7	-	7	-	-	-	17
Howard Borough	587	-	-	-	-	-	-	-	-	-	-	8	-	-	-	-	-	8
Howard Township	1,141	-	4	-	1	-	-	-	1	-	13	10	-	-	-	-	9	38
Huston Township	1,594	25	11	-	3	-	-	1	3	-	-	122	-	-	-	-	-	165
Liberty Township	2,430	41	26	-	14	-		17	1	-	80	200	1	2	1	6	1	390
Marion Township	1,346	-	-	-	1	3	3	-	-	-	-	-	-	-	-	-	-	7
Miles Township	2,770	6	12	-	1	-	-	-	-	-	-	27	-	-	1	-	-	47
Milesburg Borough	859	-	9	-	2	-	-	1	9	-	9	243	-	4	-	1	-	278

Table 4.3.4-8: Structures Vulnerable to Flooding (in SHFA) by Municipality and Land Use Type in Centre County, 2024

MUNICIPALITY	TOTAL STRUCTURES	STRUCTURES IN THE SFHA																
		AGRICULTURE	COMMERCIAL	COMMUNICATIONS	FORESTS	INDUSTRIAL	MINED LAND	MIXED USE	PUBLIC/SEMI-PUBLIC	RECLAIMED LAND	RECREATION	RESIDENTIAL	TRANSPORTATION	UTILITY	VACANT LAND	VACANT STRUCTURE	WATER	TOTAL
Millheim Borough	840	2	9	-	2	-	-	20	1	-	8	119	1	-	5	1	-	168
Patton Township	6,567	1	-	-	3	-	-	-	-	-	-	17	-	-	-	-	-	21
Penn Township	1,786	14	12	-	3	-	-	4	2	-	14	172	-	3	4	-	-	228
Philipsburg Borough	1,811	-	6	-	-	-	-	3	3	-	10	67	-	3	2	-	-	94
Port Matilda Borough	458	-	5	-	1	2	-	-	-	-	4	28	-	-	-	-	-	40
Potter Township	4,648	8	1	-	1	-	-	-	4	-	-	50	-	1	-	-	-	65
Rush Township	4,587	-	31	-	15	-	-	1	16	2	8	241	1	11	9	-	2	337
Snow Shoe Borough	595	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Snow Shoe Township	2,677	1	1	-	5	1	-	2	-	-	-	66	1	3	3	2	2	87
Spring Township	6,153	1	17	-	4	5	-	3	3	-	9	123		10	1	-	-	176
State College Borough	7,332	-	9	-	-	-	-	-	-	-	1	8	-	1	-	-	1	20
Taylor Township	1,281	14	1	-	7	-	-	-	4	-	-	57	-	5	2	-	-	90
Union Township	1,865	22	8	-	3	-	-	1	2	-	4	71	-	1	2	-	-	114
Unionville Borough	264	4	-	-	-	-	-	-	4	-	2	23	-	-	-	-	-	33
Walker Township	4,311	20	2	-	4	-	-	-	4	-	-	73	-	2	3	-	-	108
Worth Township	1,059	3	-	-	-	-	-	-	-	-	-	6	-	-	-	-	-	9
Total	**97,869**	**348**	**232**	**-**	**105**	**40**	**4**	**70**	**145**	**2**	**211**	**2,617**	**8**	**74**	**55**	**23**	**17**	**3,951**

The United States Environmental Protection Agency's (EPA) Toxics Release Inventory tracks the management of certain toxic chemicals that may pose a threat to human health and the environment. Facilities releasing and/or managing these chemicals through recycling, energy recovery, and treatment must report annual amounts used to the EPA. Six municipalities in the County have eight TRI facilities, none of which are located in the SFHA.

Table 4.3.4-9 shows conventional and unconventional oil and gas wells that are vulnerable to flooding in Centre County. Flooding of oil and gas wells can cause damage to the operations. Wells are prone to ruptured flow lines and storage tanks, which could cause environmental harm. Only two municipalities have oil and gas wells that are prone to flooding. Curtin Township has one well and Snow Shoe Township has two in the SFHA.

Table 4.3.4-9: Conventional and Unconventional Oil and Gas Well Flood Vulnerability in Centre County, 2024

MUNICIPALITY	TOTAL OIL AND GAS WELLS	TOTAL OIL AND GAS WELLS IN SFHA	PERCENT OIL AND GAS WELLS IN SFHA
Boggs Township	54	-	0.00%
Burnside Township	691	-	0.00%
Curtin Township	187	1	0.53%
Liberty Township	2	-	0.00%
Marion Township	1	-	0.00%
Rush Township	60	-	0.00%
Snow Shoe Township	607	2	0.33%
Taylor Township	2	-	0.00%
Union Township	7	-	0.00%
Worth Township	3	-	0.00%
Countywide Total	**1,614**	**3**	**0.19%**

The flood vulnerability of mobile homes in Centre County is shown in Table 4.3.4-11. Those living in mobile homes in the SFHA are at greatest risk to flood complications. In order to estimate the number of mobile home structures in the SFHA, addressable structures that fall within parcels with the land use "mobile home" were selected, then the structures were intersected with the SFHA. A total of 32 municipalities in Centre County have mobile homes. Of those municipalities, 22 contain mobile homes in the SFHA. Huston Township features the most mobile homes in the SFHA (54) followed by Milesburg Borough (45), while Milesburg Borough and Unionville Borough have the

highest percentage of mobile homes in the SFHA at 59.2 percent and 41.2 percent, respectively. Some communities have very low proportions of mobile homes in the SFHA, including Walker Township (0.5 percent), Snow Shoe Township (0.6 percent), Ferguson Township (0.8 percent), and Haines Township (1.4 percent).

Table 4.3.4-10: Mobile Home Flood Vulnerability in Centre County

MUNICIPALITY	TOTAL MOBILE HOMES	# MOBILE HOMES IN SFHA	% MOBILE HOMES IN SFHA
Bellefonte Borough	2	0	0.0%
Benner Township	492	0	0.0%
Boggs Township	365	31	8.5%
Burnside Township	35	0	0.0%
Centre Hall Borough	6	0	0.0%
College Township	74	19	25.7%
Curtin Township	129	1	0.8%
Ferguson Township	141	16	11.3%
Gregg Township	74	1	1.4%
Haines Township	18	1	5.6%
Halfmoon Township	2	0	0.0%
Harris Township	0	0	0%
Howard Borough	0	0	0%
Howard Township	88	3	3.4%
Huston Township	151	54	35.8%
Liberty Township	366	22	6.0%
Marion Township	40	0	0.0%
Miles Township	102	0	0.0%
Milesburg Borough	76	45	59.2%
Millheim Borough	27	7	25.9%
Patton Township	9	0	0.0%
Penn Township	109	16	14.7%
Philipsburg Borough	77	21	27.3%
Port Matilda Borough	26	4	15.4%
Potter Township	381	0	0.0%
Rush Township	298	36	12.1%
Snow Shoe Borough	31	0	0.0%
Snow Shoe Township	170	1	0.6%
Spring Township	75	4	5.3%
State College Borough	29	8	27.6%

Table 4.3.4-10: Mobile Home Flood Vulnerability in Centre County

MUNICIPALITY	TOTAL MOBILE HOMES	# MOBILE HOMES IN SFHA	% MOBILE HOMES IN SFHA
Taylor Township	112	8	7.1%
Union Township	231	7	3.0%
Unionville Borough	17	7	41.2%
Walker Township	204	1	0.5%
Worth Township	61	0	0.0%
Total	**4,016**	**313**	**7.8%**

4.3.4.6 Equity in Vulnerable Communities

In terms of equity, residents living within mobile homes or other manufactured homes will experience risks associated with floods, flash floods, and ice jams at a disproportionate rate due to the manufacturing of these homes. This means areas of Union Township, Unionville Borough, Benner Township, Potter Township, Centre Hall Borough, Miles Township, Rush Township, and Philipsburg Borough may be particularly vulnerable. Communities with an aged housing stock may also be more susceptible due to aged infrastructure and dated building practices. People currently experiencing homelessness are highly susceptible to flooding as they lack secure shelter. Equitable policies must ensure access to emergency shelters, temporary housing, and long-term housing solutions for people displaced by flooding. In terms of evacuation, households without vehicles or with people who have disabilities will need assistance.

4.3.5 Hurricane, Tropical Storm, Nor'easter

4.3.5.1 Location and Extent

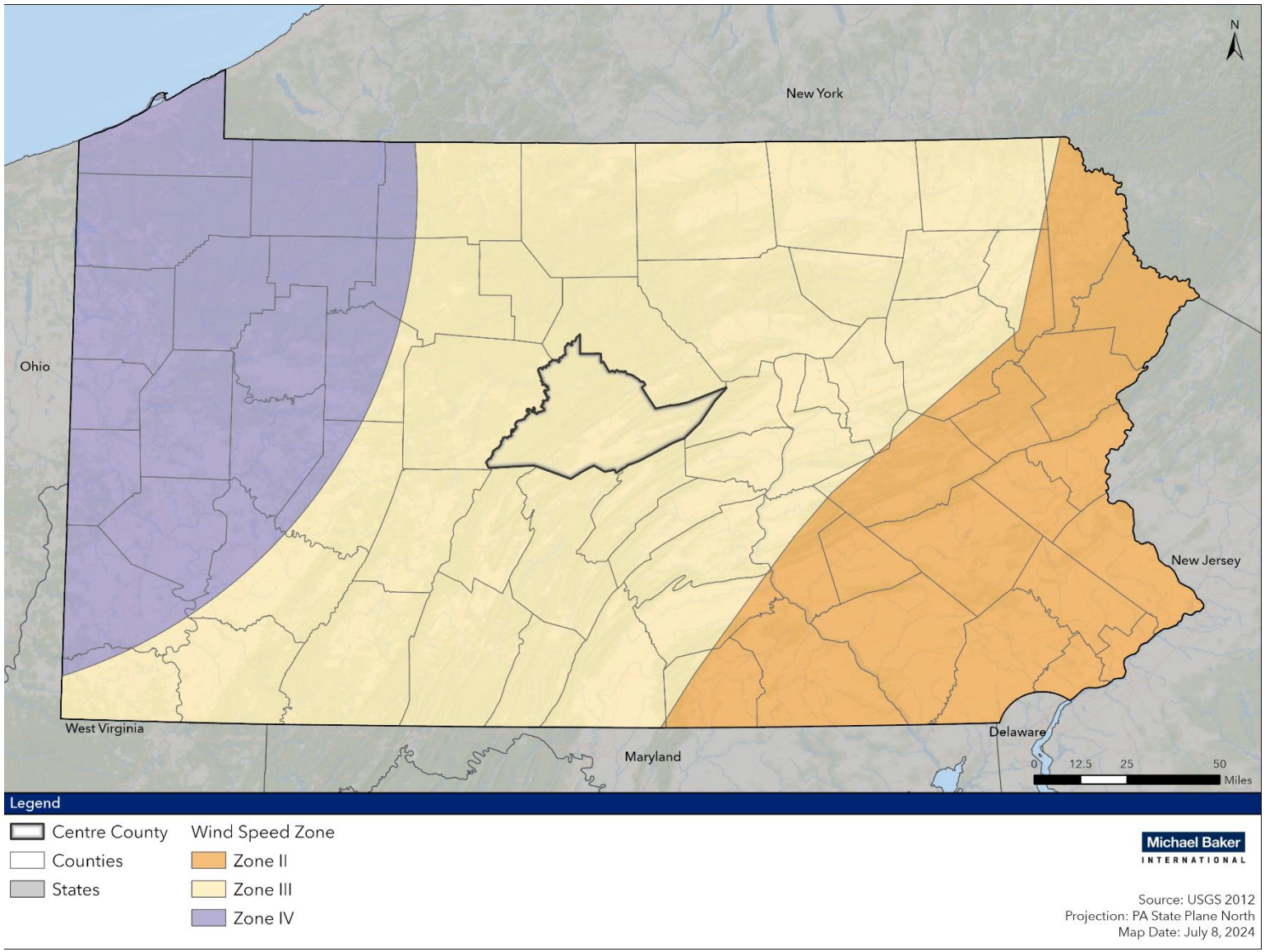


Tropical storms impacting Centre County develop in tropical or sub-tropical waters found in the Atlantic Ocean, Gulf of Mexico, or Caribbean Sea. Cyclones with maximum sustained winds of less than 39 miles per hour (mph) are called tropical depressions. A tropical storm is a cyclone with maximum sustained winds between 39-74 mph. These storms sometimes develop into hurricanes with wind speeds in excess of 74 mph.

While Centre County is located over 200 miles from the Atlantic Coast, tropical storms can track inland, causing heavy rainfall and winds. Nor'easters typically develop as extra-tropical storms which can produce winds equivalent to hurricane or tropical storm force as well as heavy precipitation, sometimes in the form of snow. These storms are regional events that can impact very large areas, hundreds to thousands of miles across, over the life the storm. Therefore, all communities within Centre County are equally subject to the impacts of hurricanes, tropical storms, and Nor'easters. Areas subject to flooding, wind, and winter storm damage are particularly vulnerable.

Figure 4.3.5.1 shows wind speed zones developed by the American Society of Civil Engineers in 2012 based on information including 40 years of tornado history and over 100 years of hurricane history. This is the most recent data available. It identifies wind speeds that could occur across the United States to be used as the basis for design and evaluation of the structural integrity of shelters and critical facilities. Centre County falls within Zone III, meaning design wind speeds for shelters and critical facilities should be able to withstand a 3-second gust of up to 200 mph, regardless of whether the gust is the result of a tornado, hurricane, tropical storm, or windstorm event. More detail on tornados and windstorms is discussed in Section 4.3.11.

Figure 4.3.5-1: Wind Speed Zones in Centre County, 2012



4.3.5.2 Range of Magnitude

The impacts associated with hurricanes and tropical storms are primarily wind damage and flooding. It is not uncommon for tornadoes to develop during these events. Historical tropical storm and hurricane events have brought intense rainfall, sometimes leading to damaging floods, northeast winds, which, combined with waterlogged soils, caused trees and utility poles to fall.

The remains of Hurricane Ivan (2004) dumped seven inches of rain on the County in 12 to 14 hours. This resulted in major flooding, reaching the 500-year floodplain in some parts of the County, such as the Central City area of Milesburg Borough. In other areas, such as Millheim Borough, though flooding occurred, it did not reach the level of the 1972 Agnes flooding event. In general terms, areas that traditionally had not flooded previously flooded on this occurrence, and areas that traditionally flood either did not, or not to the extent that would have been predicted for an event of this magnitude. In some areas, new bridges that were engineered to be above the Agnes flood waters, such as the bridge over Spring Creek at Lamb and Water streets in Bellefonte Borough, were covered in water. This flood clearly illustrates that Centre County's floodplains have been impacted by continued construction, paving, and other development activity (NOAA NCEI, 2024). For the purposes of this HMP, the 2004 Hurricane Ivan event remains the worst-case hurricane event, with Hurricane Agnes considered as a worst-case flood event. The impacts from these two tropical systems were extensive throughout Centre County and the entire state. PennLive reported statewide property damages totaling $264 million from Hurricane Ivan (PennLive 2019).

The impact tropical storm or hurricane events have on an area is typically measured in terms of wind speed. Expected damage from hurricane force winds is measured using the Saffir-Simpson Scale. The Saffir-Simpson Scale categorizes hurricane intensity linearly based upon maximum sustained winds, barometric pressure and storm surge potential (characteristic of tropical storms and hurricanes, but not a threat to Centre County), which are combined to estimate potential damage. Table 4.3.5-1 lists Saffir-Simpson Scale categories with associated wind speeds and expected damages. Categories 3, 4 and 5 are classified as "major" hurricanes. While major hurricanes comprise only 20 percent of all tropical cyclones making landfall, they account for over 70 percent of the damage in the United States.

Table 4.3.5-1: Saffir-Simpson Scale Categories with Associated Wind Speeds and Damages (NHC, 2021)

STORM CATEGORY	WIND SPEED (mph)	DESCRIPTION OF DAMAGES
1	74-95	MINIMAL: Damage is limited primarily to shrubbery and trees, unanchored mobile homes and signs. Damage to power lines may cause multi-day outages. No significant structural damage.
2	96-110	MODERATE: Some trees are toppled, some roof coverings are damaged, and major damage occurs to mobile homes. Some roofing material, door and window damage. Power outages expected for multiple days or weeks.
3	111-129	EXTENSIVE: Some structural damage to small residences and utility buildings, with a minor amount of curtain wall failures. Mobile homes are destroyed. Large trees are toppled. Terrain may be flooded well inland. Water and electricity sources are likely to be compromised for days or weeks.
4	130-156	EXTREME: Extensive damage to roofs, windows, and doors; roof systems on small buildings completely fail. More extensive curtain wall failures. Terrain may be flooded well inland.
5	>157	CATASTROPHIC: Complete roof failure on many residences and industrial buildings. Some complete building failures with small utility buildings blown over or away. Massive evacuation of residential areas may be required.

The likelihood of these damages occurring in Centre County is assessed in Section 4.3.5.4. It is important to recognize the potential for flooding during hurricane, tropical storm, and Nor'easter events; the risk assessment for these events is included Section 4.3.4. Environmental impacts associated with hurricanes and tropical storms are consistent with the impacts described for flooding in Section 4.3.4.2 and tornadoes and windstorms in Section 4.3.11.2. The impact of severe winter weather which sometimes occurs during Nor'easter events is discussed in Section 4.3.13.2.

The potential impacts of hurricanes, tropical storms, or a Nor'easter on community lifelines are as follows:

Table 4.3.5-2: Most Likely Lifelines Impacted by Hurricanes, Tropical Storms, or Nor'easter

LIFELINES	NOTES
	Government operations and facilities, including police, fire, and search and rescue are needed for response and recovery.
	Severe storms present a significant risk to buildings and infrastructure and can create issues for food and water access.
	The power grid and issues of fuel availability either due to direct damage or increased usage may occur.
	Transportation corridors may be affected due to direct damage from storm conditions, and potential impacts of other compounding hazards such as flooding and transportation incidents.
	Damage to facilities and other storage areas from storm or flooding damage may affect hazardous materials.

4.3.5.3 Past Occurrence

Figure 4.3.5-3 shows historic coastal storms which have passed through the Commonwealth of Pennsylvania. As previously stated, even if a storm did not pass through Centre County, the wind and rain from the storm could have still impacted the County.

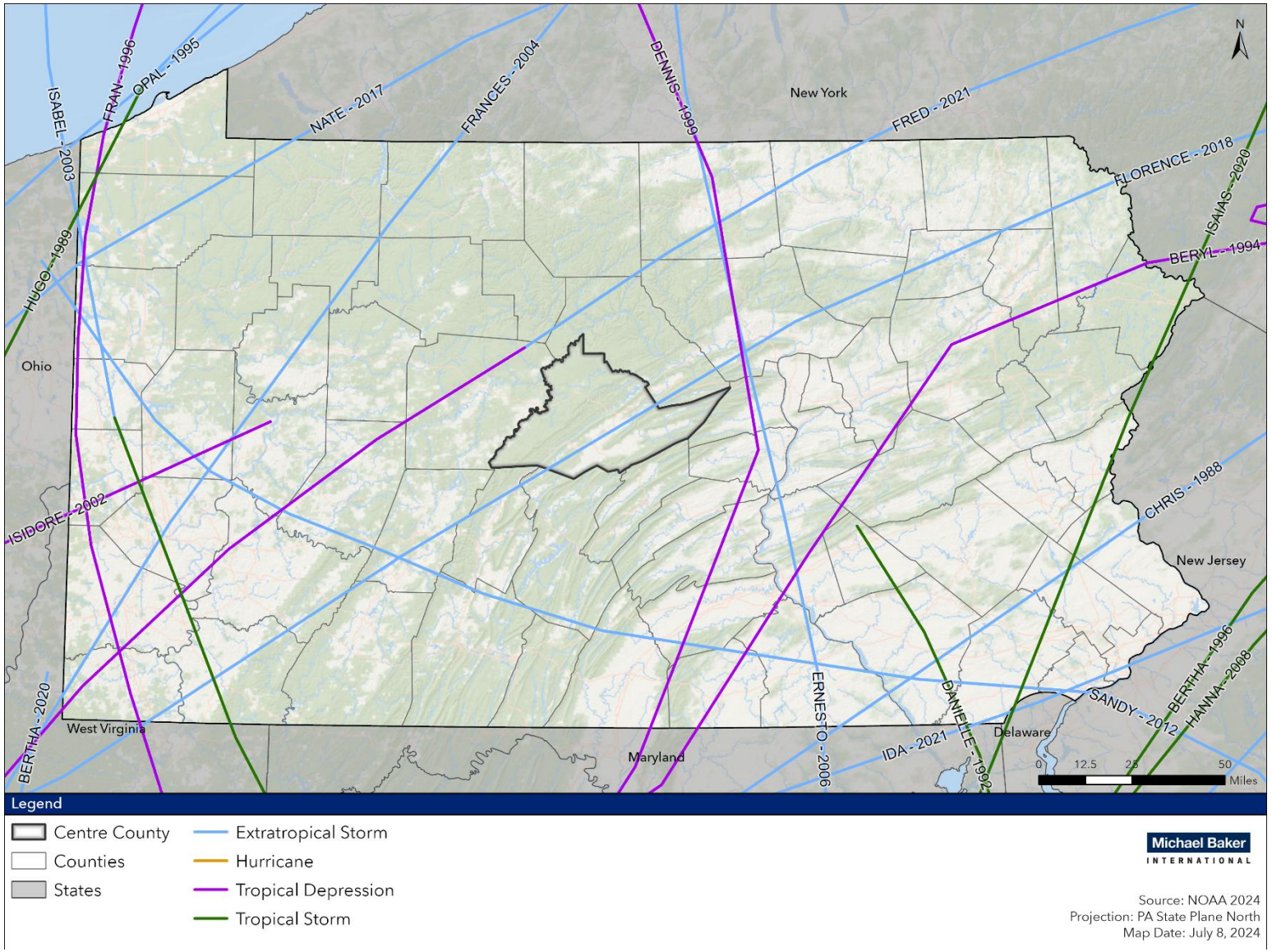
Table 4.3.5-3: Previous Tropical Storm Events Affecting Centre County (NOAA NCEI, 2024)

YEAR	EVENT
1972	Tropical Storm Agnes
1975	Hurricane Eloise
1979	Tropical Storm Frederic
1999	Hurricane Dennis
1999	Hurricane Floyd
2003	Tropical Storm Isabel

Table 4.3.5-3: Previous Tropical Storm Events Affecting Centre County (NOAA NCEI, 2024)

YEAR	EVENT
2004	Hurricane Frances
2004	Tropical Depression Ivan
2011	Tropical Storm Lee
2012	Hurricane Sandy
2013	Tropical Storm Andrea
2017	Tropical Storm Cindy
2018	Tropical Storm Gordon
2020	Tropical Storm Fay
2021	Hurricane Ida

Figure 4.3.5-2: Historic Coastal Storms in Pennsylvania, 2024



Of the storms listed in Table 4.3.5-3, Tropical Storm Agnes was the most devastating event the County experienced. Agnes made landfall in Florida as a minimal hurricane. However, as it combined with a non-tropical low over the Mid-Atlantic Region to produce rainfall amounts of up to 19 inches in some locations. Table 4.3.5-4 provides a breakdown of the damages by municipality and flood source.

Table 4.3.5-4: Distribution of Flood Damages by Municipality and Flood Source from Tropical Storm Agnes

MUNICIPALITY	FLOOD SOURCE	DAMAGES ($)
Borough of State College	Slab Cabin Run	N/A
Borough of Bellefonte	Spring Creek	1,975,000
Borough of Howard	Lick Run	304,000
Borough of Milesburg	Bald Eagle Creek	436,000
Borough of Port Matilda	Bald Eagle Creek	54,000

4.3.5.4 Future Occurrence

Although hurricanes and tropical storms can cause flood events consistent with 100- and 500- year levels, their probability of occurrence is measured relative to wind speed. Table 4.3.5-5 shows the probability of winds that reach the strength of tropical storms and hurricane conditions in Centre County and surrounding areas based on a statistical sample region of more than 30,000 square miles over a period of 46 years.

Table 4.3.5-5: Annual Probability of Tropical Storm and Hurricane Strength Wind Speeds in Centre County and Surrounding Areas (FEMA, 2000)

WIND SPEED (MPH)	CORRESPONDING SAFFIR-SIMPSON TROPICAL STORM/HURRICANE CATEGORIES	ANNUAL PROBABILITY OF OCCURRENCE (%)
45-77	Tropical Storms and Category 1 Hurricanes	91.59
78-118	Category 1 to 2 Hurricanes	8.32
119-138	Category 3 to 4 Hurricanes	0.0766
139-163	Category 4 to 5 Hurricanes	0.0086
164-194	Category 5 Hurricanes	0.00054
195+	Category 5 Hurricanes	0.00001

Table 4.3.5-5 includes wind speeds for all types of storms and is not specific to cyclonic winds. In Centre County and surrounding areas, the annual probability for winds that equal the strength of tropical storms (over 39 mph) is over 90 percent. The probability for winds at category 1 or 2 hurricane strength (78-118 mph) is greater than 8 percent in any given year. Using Table 4.3.5-1, these wind speeds correspond to minimal or

moderate expected damages. The annual probability of winds exceeding 118 mph is less than 0.1 percent.

The probability of future Hurricane, Tropical Storms, and Nor'easters impacting the County can be considered *possible* according to the Risk Factor Methodology (see Table 4.4-1).

The relationship between climate change and hurricanes is complex due to the variety of potential factors that impact their development. For example, dust from the Sahara Desert that is lifted high in the atmosphere during a particularly hot and dry summer can inhibit the development of some hurricane formation. Consensus does seem to be that future storms will produce more precipitation. This is because warming sea and air temperatures allow for more moisture in the air, providing more fuel for potential storms. The warming of the Atlantic, which is partially due to human activity like the production of greenhouse gases, has already been associated with an increase in extreme precipitation events in the northeast United States since 1996 (Huang et al., 2018). Global storm intensity is also expected to increase as a larger proportion of storms will reach Category 4 and 5 levels, but regional projections are more uncertain due to the complexity of factors. There is also a tentative connection with a general slowdown of atmospheric circulation due to warming in the Arctic, which may lead to these stronger storms lingering longer in each place. The larger rainfall totals, stronger winds, and potentially lingering storm paths will greatly increase the destructive potential of storms.

The effect of having more intense Category 4 and 5 storms may increase potential damage in the Atlantic 30% by 2100 (see NOAA GFDL's site for more details here https://www.gfdl.noaa.gov/global-warming-and-hurricanes/). In addition to those impacts, storm activity has been occurring before the official start of hurricane season (June 1st) more and more frequently, potentially signaling an extended season each year (Truchelut, et al. 2022).

4.3.5.5 Vulnerability Assessment

A vulnerability assessment for hurricanes and tropical storms focuses on the impacts of flooding and severe wind. Centre County is vulnerable to the impact of flooding and severe wind caused by hurricanes, tropical storms, and Nor'easters. Historic data indicates that while storm tracks do not typically track over Centre County, impacts from associated rain can be felt in low-lying communities vulnerable to flooding events, such as Milesburg, Millheim, Phillipsburg, and Bellefonte Boroughs. These more compact communities are near flood prone watercourses such as Spring and Pine Creek. Milesburg Borough is particularly vulnerable as it lies at the confluence of Spring Creek and the Upper Bald Eagle Creek.

A detailed assessment of Centre County's flood-related vulnerability is addressed in Section 4.3.4, while its vulnerability to wind damage is addressed in Section 4.3.11. Centre County may also be vulnerability to severe winter weather impacts caused by Nor'easters, as evaluated in Section 4.3.13.

4.3.5.6 Equity in Vulnerable Communities

Regarding equity, residents living within mobile homes or other manufactured homes will experience risks associated with severe storms at a disproportionate rate compared to other housing types due to their susceptibility to high winds and floods. This means areas of Union Township, Unionville Borough, Benner Township, Potter Township, Centre Hall Borough, Miles Township, Rush Township, and Philipsburg Borough may be particularly vulnerable. Households with no vehicles, lack of internet access, and/or no access to smartphones may have extra hurdles if evacuation is needed in the face of this hazard. This includes a large majority of the population as less populated and more rural areas are more likely to not have reliable internet access or smartphones while more urban areas such as State College Borough have limited vehicle access. Populations of people experiencing homelessness will require extra help finding locations to shelter in place.

4.3.6 Landslide

4.3.6.1 Location and Extent



While Centre County encompasses a variety of susceptibility, at the local level only minor landslides in the form of falling rock and/or mud slides have occurred to date. No serious injury, death, or property damage has occurred in the County as a result of a landslide incident.

The majority of these landslides occur along road and highway cuts through the mountains.

A landslide is the downward and outward movement of slope-forming soil, rock, and vegetation reacting to the force of gravity. Landslides may be triggered by both natural and human-caused changes in the environment, including heavy rain, rapid snow melt, steepening of slopes due to construction, erosion, earthquakes, and changes in groundwater levels. Mudflows, mudslides, rockfalls, rockslides, and rock topples are all forms of landslide (DCNR, 2020a). Landslides usually occur in areas of Centre County with moderate to steep slopes and during high precipitation. Many slope failures are associated with precipitation events – periods of sustained above-average precipitation, specific rainstorms, or snowmelt events. Areas experiencing erosion, decline in vegetation cover, and earthquakes are also susceptible to landslides. Human activities that contribute to slope failure include altering the natural slope gradient, increasing soil water content, and removing vegetation cover (DCNR, 2001). The geologic instabilities that cause landslides to occur are often exacerbated by highway projects in which the earth is cut, and soil is loosened.

The diverse topography of the County is characterized by extremes in elevation. The highest elevation is 2,600 feet above sea level at the Blair County line in Rush Township. The lowest elevation, 575 feet above sea level, is in the Bald Eagle Creek channel at the Clinton County Line. The wide differences in elevation in the various parts of Centre County have resulted in a substantial part of the land area being identified as moderately to steeply sloping. Figure 4.3.6-1 shows areas of low, moderate, and high landslide susceptibility as determined by the U.S. Geological Survey. There is a strip of low incidence area running northeast through the center of the County. The majority of the County is rated as moderate incidence with high susceptibility.

Figure 4.3.6-2 shows the steep slope soils in Centre County as defined by the Natural Resources Conservation Service (NRCS). A slope greater than 7 percent (approximately 15°) needs special considerations for building roads according to common engineering practice, and a slope of 15 percent (approximately 25°) is generally unstable and highly sensitive to surface changes (USACE, 2001). Slopes greater than 25 percent are very unstable. Given the right conditions, a landslide can occur anywhere in Centre County.

Figure 4.3.6-1: Landslide Susceptibility and Incidence in Centre County, 1997

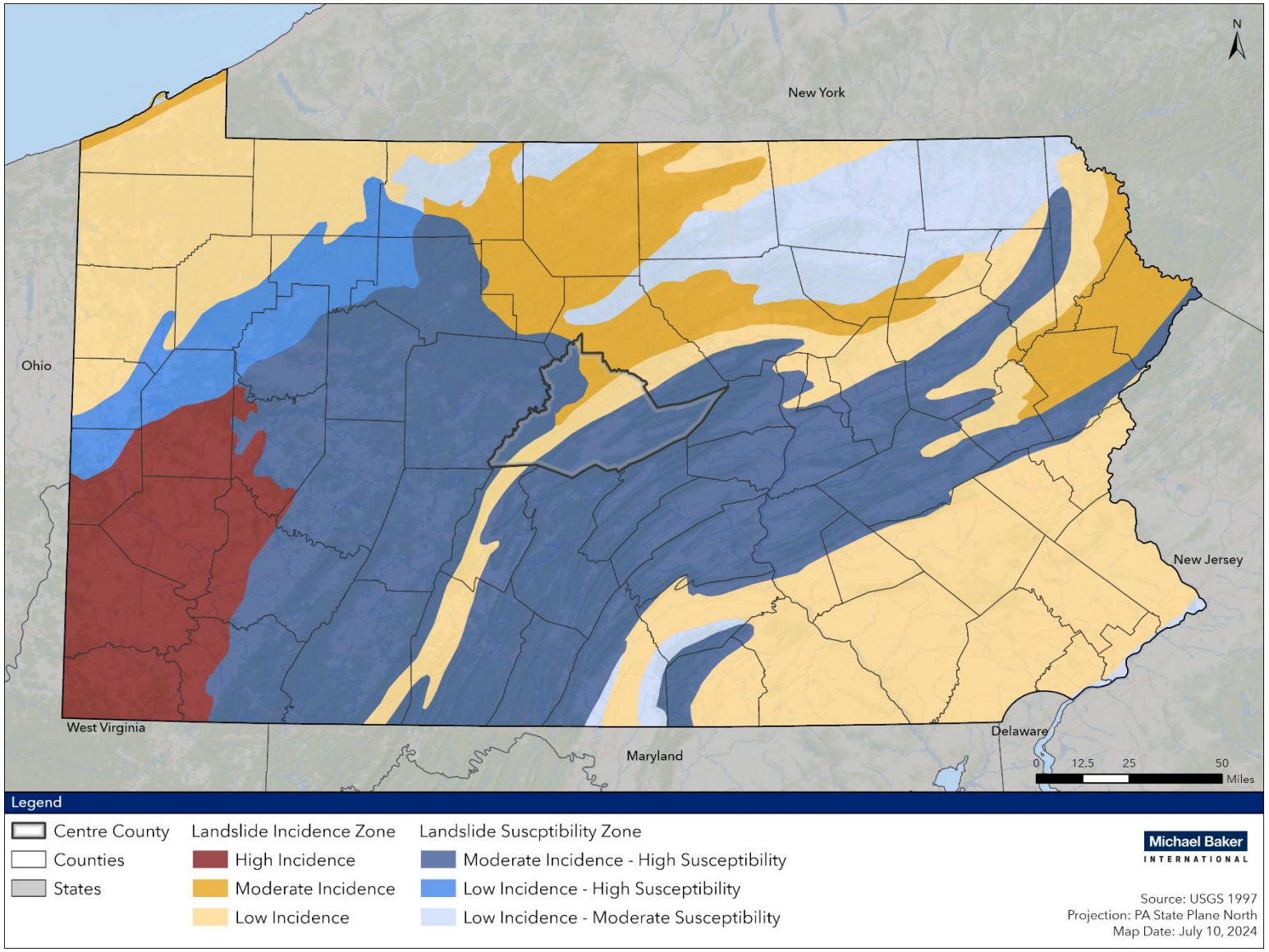
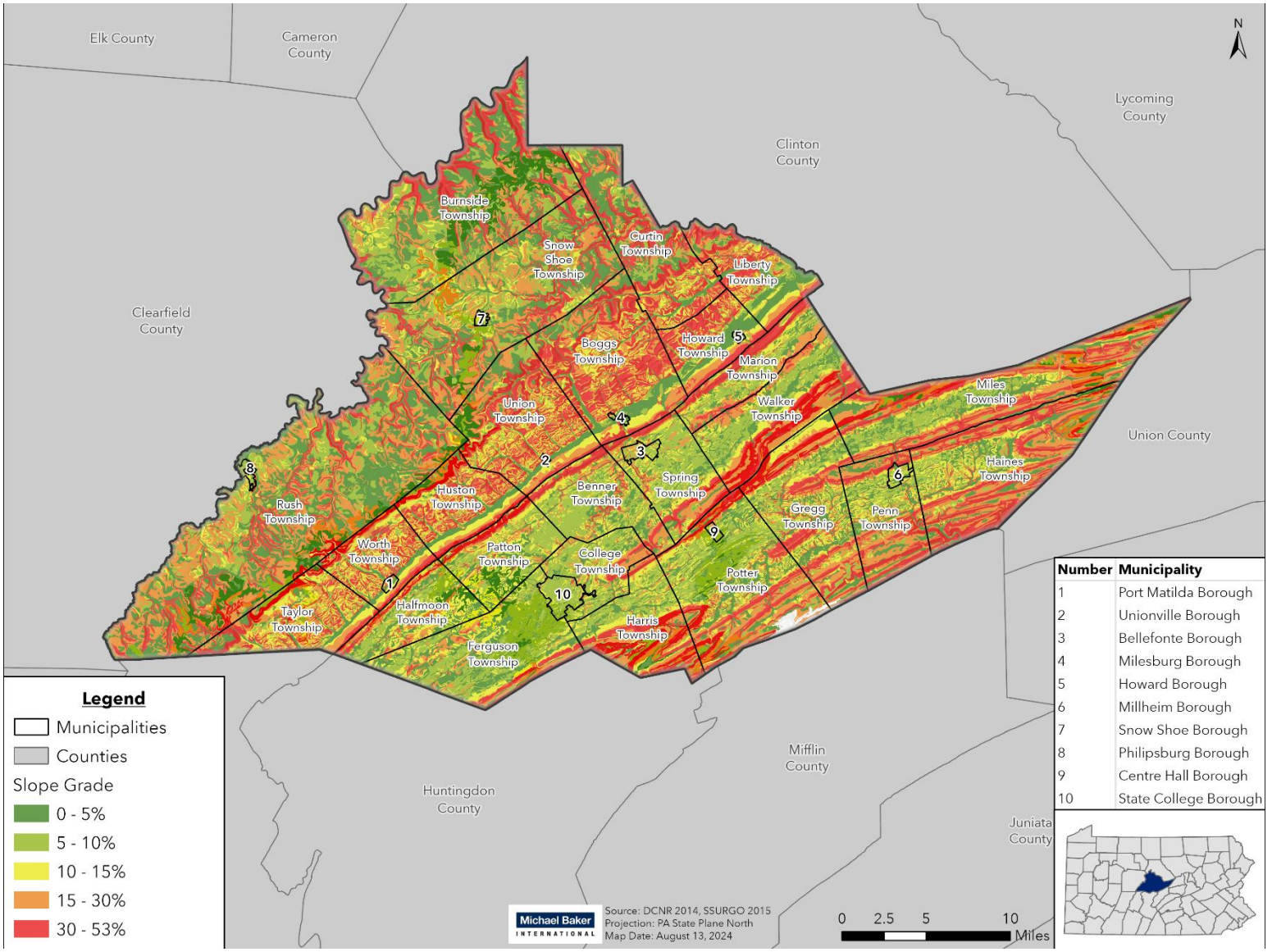


Figure 4.3.6-2: Landslide Susceptibility by Slope Grade in Centre County, 2015



4.3.6.2 Range of Magnitude

Landslide velocity can vary from rapid to slow, and the amount of material moving in a landslide can range from a relatively small amount to a large amount. Landslides can include falling, sliding, or flowing of rocks and soil or a combination of these different types of motion.

The impact of landslides on the environment depends on the size and specific location of the event. In general, impacts include:

- Changes to topography.
- Damage or destruction to vegetation.
- Potential diversion of blockage of water in the vicinity of streams, rivers, etc.
- Increased sediment runoff both during and after an event (DCNR, 2001).

Landslides in Centre County have reportedly involved a small amount of rocks tumbling down a hillside; here, a small amount means an amount sufficient to fill the shoulder of a road for a linear distance of about 10 feet with rock, but not enough to block the entire roadway. A more damaging scenario could occur in Centre County if a landslide occurred along one of the major interstates. The landslide could cause damage to vehicles and the roadway and injuries to people. In addition, the landslide would have secondary effects caused by shutting down the roadway. Storm induced debris flows are the only other type of landslide likely to cause death and injuries. As residential and recreational development increases on and near steep mountain slopes, the hazard from these rapid events will also increase. Most Pennsylvania landslides are moderate to slow moving and damage things rather than people.

Potential damage due to landslides in Centre County is limited to roadway closures and the possibility of highway accidents due to debris deposited on the roadway. No dollar estimates on expenditures by PennDOT for debris removal for specific Centre County events were available for inclusion in this document. The threat of landslides is greatest along high-volume traffic areas, especially where the road travels through a cut in the topography. A worst-case scenario event for planning purposes would involve the I-80 corridor traversing the higher risk areas of Snow Shoe Township. Crushed vehicles, stranded motorists, economic impacts due to disruptions in freight movement, as well as the cost to clear debris would result from this scenario.

The following community lifelines are affected by landslides:

Table 4.3.6-1: Most Likely Lifelines Impacted by Landslide

LIFELINES	NOTES
	Government officials will be called into action in response. Monitoring landslide risks, mapping vulnerable areas, and awareness outreach to help people become, more aware of erosion risks.
	Promoting site and building residing standards to minimize risk and even removing existing buildings from hazard areas.
	Response and recovery due to potential damage to transportation infrastructure.

4.3.6.3 Past Occurrence

A comprehensive inventory of landslide events in Pennsylvania does not exist. The NCDC database captures landslides as they occur in conjunction with severe storms; the NCDC database does not report any landslides in Centre County. However, representatives from the County and municipal officials identified several incidents within the County. Landslide activity occurred along transportation corridors during the 1972 Hurricane Agnes event. Outside of impacts to important transportation routes, landslide history is not documented as completely (if at all) as other hazards, primarily because landslides are not always seen. Beyond debris avalanches associated with significant rain and flooding activity, only minor landslides in the form of falling rock and/or mud slides have occurred in Centre County to date. Landslides with minor impact are defined as landslides impacting five or less developed properties or causing $1,000,000 or less damage. Minor landslides typically are incidents that have been in remote locations causing little to no damage.

Since landslides often occur during periods of heavy rain or snowmelt, it is possible to examine past occurrences of these events. At least 61 heavy snow events have been recorded by NCEI since 1996, which are shown in Table 4.3.6-2.

Table 4.3.6-2: Heavy Rain and Heavy Snow Events in Centre County (NOAA NCEI, 2024)

Location	Date	Event Type
Southern Centre (Zone)	1/2/1996	Heavy Snow
Northern Centre (Zone)	1/2/1996	Heavy Snow
Southern Centre (Zone)	1/12/1996	Heavy Snow

Table 4.3.6-2: Heavy Rain and Heavy Snow Events in Centre County (NOAA NCEI, 2024)

Location	Date	Event Type
Northern Centre (Zone)	3/7/1996	Heavy Snow
Southern Centre (Zone)	3/7/1996	Heavy Snow
Southern Centre (Zone)	11/28/1996	Heavy Snow
Northern Centre (Zone)	11/14/1997	Heavy Snow
Southern Centre (Zone)	11/14/1997	Heavy Snow
Southern Centre (Zone)	12/29/1997	Heavy Snow
Northern Centre (Zone)	12/29/1997	Heavy Snow
Southern Centre (Zone)	2/23/1998	Heavy Snow
Northern Centre (Zone)	3/4/1999	Heavy Snow
Southern Centre (Zone)	3/6/1999	Heavy Snow
Northern Centre (Zone)	3/6/1999	Heavy Snow
Northern Centre (Zone)	3/14/1999	Heavy Snow
Southern Centre (Zone)	3/14/1999	Heavy Snow
Northern Centre (Zone)	1/30/2000	Heavy Snow
Southern Centre (Zone)	1/30/2000	Heavy Snow
Southern Centre (Zone)	3/4/2001	Heavy Snow
Northern Centre (Zone)	3/4/2001	Heavy Snow
Southern Centre (Zone)	1/6/2002	Heavy Snow
Northern Centre (Zone)	1/6/2002	Heavy Snow
Northern Centre (Zone)	12/4/2002	Heavy Snow
Southern Centre (Zone)	12/4/2002	Heavy Snow
Southern Centre (Zone)	12/25/2002	Heavy Snow
Northern Centre (Zone)	12/25/2002	Heavy Snow
Northern Centre (Zone)	1/2/2003	Heavy Snow
Southern Centre (Zone)	1/2/2003	Heavy Snow
Southern Centre (Zone)	2/16/2003	Heavy Snow
Northern Centre (Zone)	2/16/2003	Heavy Snow
Northern Centre (Zone)	3/30/2003	Heavy Snow
Northern Centre (Zone)	12/4/2003	Heavy Snow
Southern Centre (Zone)	12/4/2003	Heavy Snow
Northern Centre (Zone)	12/14/2003	Heavy Snow
Northern Centre (Zone)	1/14/2004	Heavy Snow
Southern Centre (Zone)	1/14/2004	Heavy Snow
Southern Centre (Zone)	2/3/2004	Heavy Snow
Northern Centre (Zone)	2/3/2004	Heavy Snow

Table 4.3.6-2: Heavy Rain and Heavy Snow Events in Centre County (NOAA NCEI, 2024)

Location	Date	Event Type
Northern Centre (Zone)	3/16/2004	Heavy Snow
Southern Centre (Zone)	3/16/2004	Heavy Snow
Southern Centre (Zone)	3/19/2004	Heavy Snow
Northern Centre (Zone)	3/19/2004	Heavy Snow
Southern Centre (Zone)	2/24/2005	Heavy Snow
Northern Centre (Zone)	3/1/2005	Heavy Snow
Southern Centre (Zone)	3/1/2005	Heavy Snow
Northern Centre (Zone)	10/25/2005	Heavy Snow
Southern Centre (Zone)	12/9/2005	Heavy Snow
Northern Centre (Zone)	12/9/2005	Heavy Snow
Northern Centre (Zone)	2/13/2007	Heavy Snow
Northern Centre (Zone)	3/16/2007	Heavy Snow
Northern Centre (Zone)	3/6/2011	Heavy Snow
Southern Centre (Zone)	3/6/2011	Heavy Snow
Southern Centre (Zone)	10/29/2011	Heavy Snow
Northern Centre (Zone)	10/29/2011	Heavy Snow
Northern Centre (Zone)	4/22/2012	Heavy Snow
Southern Centre (Zone)	2/13/2014	Heavy Snow
Northern Centre (Zone)	2/13/2014	Heavy Snow
Southern Centre (Zone)	11/25/2014	Heavy Snow
Southern Centre (Zone)	01/06/2024	Heavy Snow

However, rainstorms in October 2016 resulted in a landslide that led to road failure along Purdue Mountain Road in Benner Township as is shown in Figure 4.3.6-3. The Township worked with PEMA and FEMA to secure grant funding to help address the failure (Benner Township, 2018). After the road was closed for more than a year, the road damage was ultimately addressed in August 2018.



Figure 1.2.1-1: Figure 4.3.6-3: Road Failure Along Purdue Mountain Road in Benner Township, 2016

4.3.6.4 Future Occurrence

Significant landslide events are unlikely in the County. However, there is the possibility of some rock falling from a steep slope, given that this occurred several times in the past. These events are expected to be small, and cause little to no damage. The

probability of large-scale future landslide events in Centre County is considered potential due to the County's position over the Appalachian Mountain section physiographic province. This is a geological formation with moderate to high landslide potential. Mismanaged intense development in steeply sloped areas could increase their frequency of occurrence. Building and road construction are contributing development factors to landslides as they can often undermine or steep otherwise stable soil. Additionally, as noted in Section 4.3.4, Centre County anticipates an increase in the frequency and magnitude of flood events as a result of increasing amounts and intensity of precipitation due to climate change. Increased rainfall has also been shown to increase occurrences of landslide events. Therefore, the probability of future landslide events can be considered *possible* according to the Risk Factor Methodology (see Table 4.4-1).

4.3.6.5 Vulnerability Assessment

Landslides can result in the disruption of roads, water, sewer, gas, electric and phone lines, as well as serious damage to public and private property. The loss of life likely to happen in such an occurrence would be a major concern, particularly for those areas where multi-family construction has taken place. While the majority of development in Centre County is not particularly vulnerable to landslides, any landslide events that do occur would take place in steeply sloped areas. In addition, places where landforms have been altered for purposes of highway construction or other development may be uniquely vulnerable to landslide hazards. This is especially true if development is located at the base or crest of cliffs or near large highway cut-outs. The County has indicated that roads where this potential exists are marked with warning signs and barriers have been installed in areas where significant rock fall or landsliding is likely. These areas should be considered vulnerable to landslides, particularly if mitigation measures have not been implemented. Additionally, increased deforestation and soil disturbances caused by development on sloped areas may further increase these risks. As timbering and development of sloped land continue, the risk of significant landslides increases.

Table 4.3.6-3 summarizes the number of existing structures and critical facilities (excluding oil and gas wells) in Centre County that are located in areas with steep slopes. Approximately 12 percent of all structures in the County are located on slopes greater than 15 percent. Spring Township has the most structures located on a slope with over 850 structures. Boggs Township (846) and Bellefonte Borough (769) also have a large number of structures in landslide prone areas. Worth Township and Howard Township have the greatest percentage of structures located on slopes over 15 percent, with 27 percent and 26 percent, respectively. A total of 17 municipalities contained

critical facilities on steep slopes totaling 31 facilities (not including oil and gas wells, which are analyzed separately in Table 4.3.6-5). Critical facilities vulnerable to landslides are primarily dams, day cares and water treatment plants. Landslide events at these facilities could lead to the secondary effect of flood hazards. There is also one fire station, two congregate care facilities and two medical facilities prone to landslide hazards.

Table 4.3.6-4 depicts the number of structures in each municipality located in areas susceptible to landslides due to steep slopes by land use type. Most vulnerable structures (9,670) are residential properties, followed by forests (810) and agriculture (749). F

Table 4.3.6-5 shows the number of oil and gas wells that are in areas susceptible to landslides. Landslides have the potential to disrupt and damage oil and gas well operations. Damage to the operations could cause environmental harm. In Centre County, approximately 33 percent of all oil and gas wells are located on slopes greater than 15 percent, which makes them prone to landslides. Snow Shoe Township has 223 wells that are vulnerable, and Burnside Township has 177. All municipalities with oil and gas wells have at least one well vulnerable to landslides.

Table 4.3.6-3: Structures and Critical Facilities Vulnerable to Landslides in Centre County, 2024

MUNICIPALITY	TOTAL STRUCTURES	TOTAL STRUCTURES ON SLOPES >15%	PERCENT STRUCTURES ON SLOPES >15%	TOTAL CRITICAL FACILITIES	CRITICAL FACILITIES ON SLOPES >15%	PERCENT CRITICAL FACILITIES ON SLOPES >15%
Bellefonte Borough	3,608	769	21%	21	-	0%
Benner Township	4,185	635	15%	26	3	12%
Boggs Township	3,300	846	26%	8	-	0%
Burnside Township	753	97	13%	3	-	0%
Centre Hall Borough	1,006	54	5%	5	-	0%
College Township	6,214	488	8%	42	4	10%
Curtin Township	1,055	272	26%	2	1	50%
Ferguson Township	9,125	404	4%	34	1	3%
Gregg Township	3,131	628	20%	15	4	27%
Haines Township	2,580	356	14%	10	2	20%
Halfmoon Township	2,148	287	13%	9	1	11%
Harris Township	3,803	247	6%	11	-	0%
Howard Borough	587	0	0%	9	-	0%
Howard Township	1,141	302	26%	6	1	17%
Huston Township	1,594	398	25%	2	-	0%
Liberty Township	2,430	498	20%	6	-	0%
Marion Township	1,346	257	19%	5	2	40%
Miles Township	2,770	283	10%	13	1	8%
Milesburg Borough	859	65	8%	7	-	0%
Millheim Borough	840	35	4%	2	-	0%
Patton Township	6,567	520	8%	24	-	0%
Penn Township	1,786	465	26%	17	4	24%
Philipsburg Borough	1,811	55	3%	12	-	0%
Port Matilda Borough	458	7	2%	4	-	0%

Table 4.3.6-3: Structures and Critical Facilities Vulnerable to Landslides in Centre County, 2024

MUNICIPALITY	TOTAL STRUCTURES	TOTAL STRUCTURES ON SLOPES >15%	PERCENT STRUCTURES ON SLOPES >15%	TOTAL CRITICAL FACILITIES	CRITICAL FACILITIES ON SLOPES >15%	PERCENT CRITICAL FACILITIES ON SLOPES >15%
Potter Township	4,648	604	13%	15	1	7%
Rush Township	4,587	626	14%	26	1	4%
Snow Shoe Borough	595	33	6%	3	-	0%
Snow Shoe Township	2,677	460	17%	6	-	0%
Spring Township	6,153	853	14%	30	1	3%
State College Borough	7,332	183	2%	42	1	2%
Taylor Township	1,281	283	22%	1	-	0%
Union Township	1,865	484	26%	7	-	0%
Unionville Borough	264	24	9%	1	-	0%
Walker Township	4,311	383	9%	12	2	17%
Worth Township	1,059	287	27%	3	1	33%
Total	**97,869**	**12,188**	**12%**	**439**	**31**	**7%**

Table 4.3.6-4: Structure by Land Use Landslide Vulnerability in Centre County, 2024

MUNICIPALITY	TOTAL STRUCTURES	STRUCTURES LOCATED IN LANDSLIDE-PRONE AREAS																	
		AGRICULTURE	COMMERCIAL	COMMS.	FORESTS	INDUSTRIAL	MINED LAND	MIXED USE	PUBLIC/SEMI-PUBLIC	RECLAIMED LAND	RECREATION	RESIDENTIAL	TRANSPORTATION	UTILITY	VACANT LAND	VACANT STRUCTURE	WATER	BLANK	TOTAL
Bellefonte Borough	3,608	1	16	-	3	6	-	23	12	-	-	702	3	-	2	1	-	-	769
Benner Township	4,185	26	8	8	45	2	1	-	14	-	5	511	-	3	11	1	-	-	635
Boggs Township	3,300	78	13	4	35	6	3	3	6		15	681		1	1				846
Burnside Township	753	-	4	1	4	-	3	-	1	2	-	79	1	1	1	-	-	-	97
Centre Hall Borough	1,006	-	-	-	2	-	-	-	-	-	-	52	-	-	-	-	-	-	54
College Township	6,214	33	46	-	16	9	-	-	3	-	4	366	1	4	6	-	-	-	488
Curtin Township	1,055	43	-	1	16	-	-	-	1	-	4	203	-	3	-	1	-	-	272
Ferguson Township	9,125	29	1	6	45	3	-	-	1	-	-	315	2	1	1	-	-	-	404
Gregg Township	3,131	58	7	-	60	-	-	10	7	-	-	472	-	1	6	6	1	-	628
Haines Township	2,580	72	1	-	15	-	2	-	-	-	23	239	-	3	1	-	-	-	356
Halfmoon Township	2,148	33	4	3	41	-	-	-	-	-	-	201	1	2	1	-	-	-	287
Harris Township	3,803	4	-	-	20	-	-	-	3	-	6	211	-	1	1	-	1	-	247
Howard Borough	587	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Table 4.3.6-4: Structure by Land Use Landslide Vulnerability in Centre County, 2024

MUNICIPALITY	TOTAL STRUCTURES	STRUCTURES LOCATED IN LANDSLIDE-PRONE AREAS																	
		AGRICULTURE	COMMERCIAL	COMMS.	FORESTS	INDUSTRIAL	MINED LAND	MIXED USE	PUBLIC/SEMI-PUBLIC	RECLAIMED LAND	RECREATION	RESIDENTIAL	TRANSPORTATION	UTILITY	VACANT LAND	VACANT STRUCTURE	WATER	BLANK	TOTAL
Howard Township	1,141	18	13	1	16	-	-	5	-	-	-	245	-	2	1	1	-	-	302
Huston Township	1,594	25	10	3	36	1	-	2	2	-	-	304	3	-	12	-	-	-	398
Liberty Township	2,430	27	3	1	27	-	-	-	6	-	2	429	-	2	1	-	-	-	498
Marion Township	1,346	24	1	1	26	2	4	-	2	-	-	194	-	1	2	-	-	-	257
Miles Township	2,770	30	3	2	30	-	-	-	1	-	-	212	-	4	1	-	-	-	283
Milesburg Borough	859	-	-	-	-	-	-	-	16	-	-	47	-	1	1	-	-	-	65
Millheim Borough	840	3	-	-	-	-	-	4	-	-	-	25	1	1	1	-	-	-	35
Patton Township	6,567	11	7	-	28	2	-	-	4	-	-	457	1	2	8	-	-	-	520
Penn Township	1,786	36	2	4	33	-	-	2	-	-	36	346	-	3	3	-	-	-	465
Philipsburg Borough	1,811	-	1	-	1	-	-	-	2	-	-	48	-	-	3	-	-	-	55
Port Matilda Borough	458	-	-	-	-	-	-	-	-	-	-	7	-	-	-	-	-	-	7
Potter Township	4,648	54	9	1	41	-	1	1	27	-	-	463	-	2	5	-	-	-	604
Rush Township	4,587	3	30	8	47	2	8	3	11	3	39	451	4	7	9	1	-	-	626

Table 4.3.6-4: Structure by Land Use Landslide Vulnerability in Centre County, 2024

MUNICIPALITY	TOTAL STRUCTURES	STRUCTURES LOCATED IN LANDSLIDE-PRONE AREAS																	
		AGRICULTURE	COMMERCIAL	COMMS.	FORESTS	INDUSTRIAL	MINED LAND	MIXED USE	PUBLIC/SEMI-PUBLIC	RECLAIMED LAND	RECREATION	RESIDENTIAL	TRANSPORTATION	UTILITY	VACANT LAND	VACANT STRUCTURE	WATER	BLANK	TOTAL
Snow Shoe Borough	595	-	2	-	2	-	-	-	-	1	2	26	-	-	-	-	-	-	33
Snow Shoe Township	2,677	19	11	3	39	2	13	1	-	7	1	359	2	1	2	-	-	-	460
Spring Township	6,153	17	23	8	41	1	7	3	12	-	5	701	-	8	27	-	-	-	853
State College Borough	7,332	-	9	-	3	-	-	-	1	-	-	167	-	2	1	-	-	-	183
Taylor Township	1,281	23	4	1	20	2	-	4	1	-	-	221	-	4	3	-	-	-	283
Union Township	1,865	46	-	2	52	-	-	3	-	-	-	375	-	-	6	-	-	-	484
Unionville Borough	264	-	-	-	-	-	-	-	-	-	-	24	-	-	-	-	-	-	24
Walker Township	4,311	17	2	-	45	-		-	2	-	1	308	-	7	1	-	-	-	383
Worth Township	1,059	19	2	5	21	4	-	2	-	-	-	229	-	2	3	-	-	-	287
Total	**97,869**	**749**	**232**	**63**	**810**	**42**	**42**	**66**	**135**	**13**	**143**	**9,670**	**19**	**69**	**121**	**11**	**2**	**-**	**12,188**

Table 4.3.6-5: Conventional and Unconventional Oil and Gas Well Landslide Vulnerability in Centre County, 2024

MUNICIPALITY	TOTAL OIL AND GAS WELLS	TOTAL OIL AND GAS WELLS ON SLOPES OVER 15%	PERCENT OIL AND GAS WELLS ON SLOPES OVER 15%
Boggs Township	54	23	43%
Burnside Township	691	179	26%
Curtin Township	187	80	43%
Liberty Township	2	1	50%
Marion Township	1	1	100%
Rush Township	60	26	43%
Snow Shoe Township	607	216	36%
Taylor Township	2	1	50%
Union Township	7	2	29%
Worth Township	3	1	33%
Countywide Total	**1,614**	**530**	**33%**

4.3.6.6 Equity in Vulnerable Communities

Equity considerations include those who live in manufactured homes as they are highly susceptible to any ground disturbances. This means areas of Union Township, Benner Township, Potter Township, Miles Township, and Rush Township may be particularly vulnerable. Low-income communities, which may have weaker infrastructure, such as poorly maintained roads and inadequate drainage systems which exacerbate landslide risks, will also be at a higher risk. In terms of immediate safety risks, vulnerable populations, such as the elderly, people with disabilities, or those without access to emergency shelters, may face greater risks. This means areas of State College Borough, Bellefonte Borough, Boggs Township, Milesburg Borough, Curtin Township, Liberty Township, Howard Township, Howard Borough, Patton Township, College Township, Ferguson Township, Gregg Township, Spring Township may be particularly vulnerable.

4.3.7 Lightning Strike



Lightning is a rapid discharge of electrical energy in the atmosphere. When the charge difference between the ground and the cloud becomes too large, a conductive channel of air develops between the cloud and the ground, and a small amount of charge (step leader) starts moving toward the ground. When it nears the ground, an upward leader of opposite charge connects with the step leader. At the instant this connection is made, a powerful discharge occurs between the cloud and the ground. This discharge is seen as a bright visible flash of lightning.

4.3.7.1 Location and Extent

Lightning events occur across the entire Commonwealth. Different areas experience varying event frequencies, but in all cases, lightning strikes occur primarily during the summer months. While the impact of flash events is highly localized, strong storms can result in numerous widespread events over a broad area. In addition, the impacts of an event can be serious or widespread if lightning strikes a particularly significant location, such as a power station or large public venue.

More than 100,000 thunderstorms occur in the United States each year, with lightning striking more than 25 million points on the ground during that same period. This causes an average of 20 fatalities and hundreds of injuries each year (NOAA, 2024). Lightning can occur with all thunderstorms, of which the entire county is susceptible. Lightning fatalities are most common during the summer and during the afternoon and evening.

4.3.7.2 Range of Magnitude

Because lightning damage is largely unreported, statistics vary considerably. The insurance industry, however, estimates 6.5 percent of all property/casualty claims are related to lightning strikes (Credit Union National Association, 2015). While it is difficult to quantify lightning losses, it is estimated that $4-5 billion damage occurs each year. Likewise, the cost of lightning protection to safeguard critical equipment and facilities from lightning strikes during severe weather is enormous. In statistics kept from 1959-1994, Pennsylvania was reported to have the largest number of damage reports due to lightning of any state, with 1,441 (Curran, 1999).

The worst-case scenario for a lightning strike is envisioned to occur during a capacity football game at Beaver Stadium, located on the Penn State University campus. Large outdoor stadiums face a significant and growing vulnerability to lightning due to the size of crowds. There are, however, relatively few college football games held over the

course of the year, and even fewer held during seasons most susceptible to lightning activity. While to date, there have been few casualties in the United States from direct lightning strikes to a stadium or from the mass movement of spectators when lightning threatens, the HMSC wanted to recognize this potential, albeit extremely low-risk, event.

The potential impacts of lightning strikes on community lifelines are as follows:

Table 4.3.7-1: Most Likely Lifelines Impacted by Lightning Strike

lifelines	NOTES
	The potential harm caused by a direct strike or due to the possibility of wildfires.
	Lightning strikes may cause significant damage to electrical utilities and cause outages
	Potential damage to communications infrastructure and the impact for emergency response.

4.3.7.3 Past Occurrence

Records from the NCEI show that there were 400 lightning events in the 57 counties across Pennsylvania between 1996 and 2024. A lightning "event" is defined as a lightning strike that results in fatality, injury, and/or property or crop damage (NOAA NWS, 2016).

Total deaths caused by lightning from 2006 to 2023 were collected for each state, ranking Pennsylvania ninth (15 deaths) in the country (NLSC, 2024). From 1959 to 1994, Pennsylvania ranked third among all states with 644 casualties (i.e., combination of deaths and injuries) (NOAA NWS, 1997). This represents approximately 5 percent of casualties, which occurred throughout the United States over that 35-year period.

Pennsylvania ranked first among all states in the United States with 1,441 damage reports. However, it is unclear what the total dollar value is for these damages, and there is no account of the spatial distribution of damages below the state level (Curran, 1999). In 2023, Pennsylvania ranked ninth in the nation for number of homeowner's insurance claims for lightning losses, with 2,214 claims. These claims valued approximately $27.2 million, with each claim costing an average of $12,296 (III, 2024).

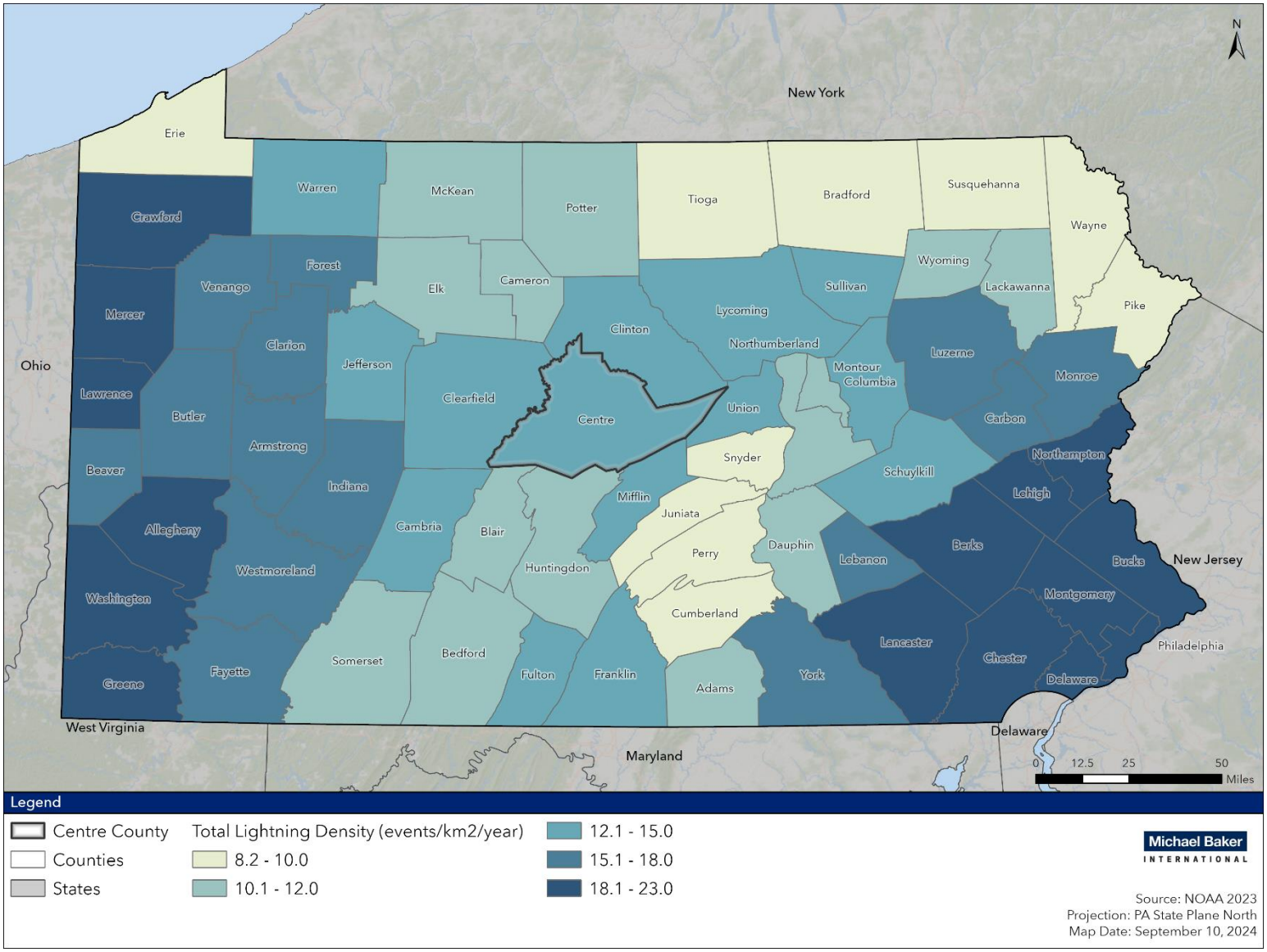
Figure 4.3.7-3 shows how the lightning strike incident rate in Centre County compares with the rest of the state.

4.3.7.4 Future Occurrence

The future occurrence of lightning and thunderstorm activity in Centre County is anticipated, and the susceptibility to damage from these severe storms will remain unchanged. However, the probability of lighting strike events resulting in multiple casualties or extensive structural damage is considered *unlikely* according to the Risk Factor Methodology (see Table 4.4-1).

The number of lightning events are influenced by the frequency of a severe thunderstorm occurrence. Therefore, potential future changes in climate and weather conditions may impact the future occurrences of lightning strike. According to the Pennsylvania Climate Impacts Assessment Update, thunderstorms are projected to increase in frequency (Shortle et al, 2015). However, the future occurrence of lightning activity is not forecasted as lightning strikes are frequent and widespread and forecasters' understanding of the cloud electrification process is incomplete (NOAA NSSL, 2018).

Figure 4.3.7-1: Total Lightning Density Events



4.3.7.5 Vulnerability Assessment

The potential for lightning strikes and thunderstorms will always exist for all 35 municipalities in Centre County. Outdoors activities and events are particularly vulnerable, and when lightning threatens a large outdoor venue, the game or event itself is usually postponed.

As identified in Table 4.3.7-1, forests, electrical utilities and communications infrastructure may be more at risk due to the cascading impacts of wildfire, urban fire and utility interruption. Burnside, Snow Shoe, Curtin, and Liberty Townships have the highest concentration of forests, so may be more at risk during a lightning event to the cascading impacts of wildfires. The communities with the most power plants include College Township (2), Taylor Township (2) and State College Borough (1), and the communities with the most cellular towers include Snow Shoe Township (3), Rush Township (2) and Boggs Township (2). These communities also may be more at risk during a lightning event to urban fires or utility interruption.

Penn State University utilizes advanced technology and software applications from a private vendor to monitor weather conditions in real time, delivering information via cell phone to keep personnel ahead of the weather. Coaches and trainers use lightning information to get athletes off the field or move practice indoors. Penn State University is a StormReady University, a designation obtained through participation in the NWS StormReady Program, which includes six guidelines met by Penn State University, namely:

- Communication and Coordination - A control center must be fully staffed at all times to implement severe weather procedures.
- Warning Reception – At least four redundant systems in place at the control center to receive weather warnings.
- Hydrometeorological Monitoring – At least three methods of monitoring weather conditions must be present in the control center.
- Local Warning Dissemination – There must be at least three redundant systems to notify the University community of severe weather warnings.
- Community Preparedness – There must be plans in place at the University for building occupants to follow in the event of severe weather.
- Administration – The University must also meet a number of administrative criteria that include ongoing coordination with NWS staff, training of staff, and reporting procedures in place to notify the NWS of damages caused by storms on campus.

Losses due to lightning can be lessened by installing surge protection on critical electronic, lightning, or information technology systems. Lightning protection devices

and methods, such as lightning rods and grounding, can be installed on a community's communications infrastructure and other critical facilities to reduce losses.

4.3.7.6 Equity In Vulnerable Communities

In terms of equity, those in lower-income communities are more likely to have housing with inadequate grounding or surge protection, increasing their vulnerability to lightning strikes. This includes State College Borough, Bellefonte Borough, and Ferguson Township as they have areas with the highest populations below the poverty level. Rural communities, both due to the vast amount of open space and outdoor workers (e.g., farmers), may be at higher risk for coming into contact with lightning strikes. Adequate awareness and storm warning systems may be needed.

4.3.8 Radon Exposure



4.3.8.1 Location and Extent

Radioactivity caused by airborne radon has been recognized for many years as an important component in the natural background radioactivity exposure of humans, but it was not until the 1980s that the wide geographic distribution of elevated values in houses and the possibility of extremely high radon values in houses were recognized. In 1984, routine monitoring of employees leaving the Limerick nuclear power plant near Reading, Pennsylvania, showed that the readings on Mr. Stanley Watras frequently exceeded expected radiation levels, yet only natural, non-fission-product radioactivity was detected on him. Radon levels in his home were detected around 2,500 pCi/L (pico Curies per Liter), much higher than the 4 pCi/L guideline of the Environmental Protection Agency or even the 67 pCi/L limit for uranium miners. As a result of this event, the Reading Prong section of Pennsylvania where Watras lived became the focus of the first large-scale radon scare in the world.

Radon is a gas that cannot be seen or smelled. It is a noble gas that originates by the natural radioactive decay of uranium and thorium. Like other noble gases (e.g., helium, neon, and argon), radon forms essentially no chemical compounds and tends to exist as a gas or as a dissolved atomic constituent in groundwater. Two isotopes of radon are significant in nature, 222Rn and 220Rn, formed in the radioactive decay series of 238U and 232Th, respectively. The isotope thoron (i.e. 220Rn) has a half-life (time for decay of half of a given group of atoms) of 55 seconds, barely long enough for it to migrate

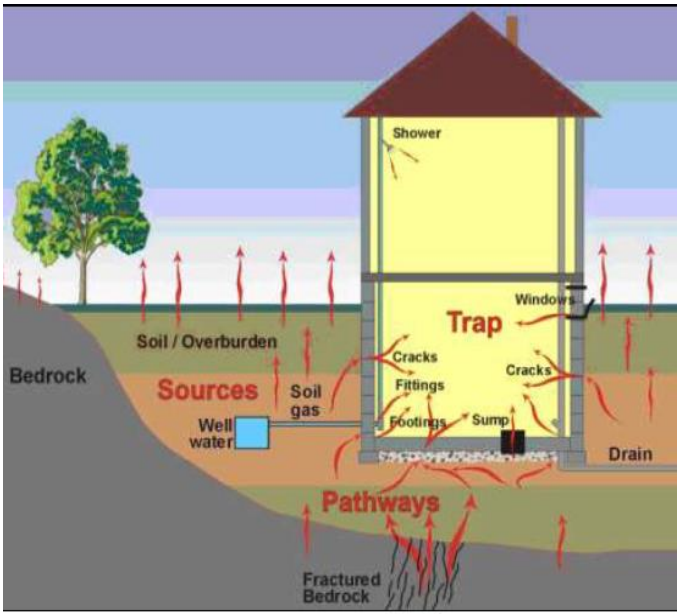
from its source to the air inside a house and pose a health risk. However, radon (i.e. 222Rn), which has a half-life of 3.8 days, is a widespread hazard. (DOI, 1992)

The distribution of radon is correlated with the distribution of radium (i.e. 226Ra), its immediate radioactive parent, and with uranium, its original ancestor. Due to the short half-life of radon, the distance that radon atoms can travel from their parent before decay is generally limited to distances of feet or tens of feet. (DOI,1992)

Three sources of radon in houses are now recognized (shown in Figure 4.3.8-1):

- Radon in soil air that flows into the house;
- Radon dissolved in water from private wells and exsolved during water usage; this is rarely a problem in Pennsylvania; and
- Radon emanating from uranium-rich building materials (e.g. concrete blocks or gypsum wallboard); this is not known to be a problem in Pennsylvania.

Figure 4.3.8-1: Sketch of Radon Entry Points into a House (Arizona Geological Survey, 2006)



High radon levels were initially thought to be exacerbated in houses that are tightly sealed, but it is now recognized that rates of air flow into and out of houses, plus the location of air inflow and the radon content of air in the surrounding soil, are key factors in radon concentrations. Outflows of air from a house, caused by a furnace, fan, thermal "chimney" effect, or wind effects, require that air be drawn into the house to compensate. If the upper part of the house is tight enough to impede influx of outdoor air (radon concentration generally <0.1 pCi/L), then an appreciable fraction of the air may be drawn in from the soil or fractured bedrock through the foundation and slab beneath the house, or through cracks and openings for pipes, sumps, and similar features (see figure 4.3.8-1). Soil gas typically contains from a few hundred to a few thousand pCi/L of radon; therefore, even a small rate of soil gas inflow can lead to elevated radon concentrations in a house.

The radon concentration of soil gas depends upon a number of soil properties, the importance of which is still being evaluated. In general, ten to fifty percent of newly

formed radon atoms escape the host mineral of their parent radium and gain access to the air-filled pore space. The radon content of soil gas clearly tends to be higher in soils containing higher levels of radium and uranium, especially if the radium occupies a site on or near the surface of a grain from which the radon can easily escape. The amount of pore space in the soil and its permeability for air flow, including cracks and channels, are important factors determining radon concentration in soil gas and its rate of flow into a house. Soil depth and moisture content, mineral host and form for radium, and other soil properties may also be important. For houses built on bedrock, fractured zones may supply air having radon concentrations similar to those in deep soil.

Each county in Pennsylvania is classified as having a *low*, *moderate*, or *high* radon hazard potential. Centre County is classified as having a high hazard, meaning there is a predicted indoor radon level greater than 4 pCi/L (see Figure 4.3.8-2).

Areas where houses have high levels of radon can be divided into three groups in terms of uranium content in rock and soil:

- Areas of very elevated uranium content (>50 ppm) around uranium deposits and prospects. Although very high levels of radon can occur in such areas, the hazard normally is restricted to within a few hundred feet of the deposit. In Pennsylvania, such localities occupy an insignificant area.
- Areas of common rocks having higher than average uranium content (5 to 50 ppm). In Pennsylvania, such rock types include granitic and felsic alkali igneous rocks and black shales. In the Reading Prong, high uranium values in rock or soil and high radon levels in houses are associated with Precambrian granitic gneisses commonly containing 10 to 20 ppm uranium, but locally containing more than 500 ppm uranium. In Pennsylvania, elevated uranium occurs in black shales of the Devonian Marcellus Formation and possibly the Ordovician Martinsburg Formation. High radon values are locally present in areas underlain by these formations.
- Areas of soil or bedrock that have normal uranium content but properties that promote high radon levels in houses. This group is incompletely understood at present. Relatively high soil permeability can lead to high radon, the clearest example being houses built on glacial eskers. Limestone-dolomite soils also appear to be predisposed for high radon levels in houses, perhaps because of the deep clay-rich residuum in which radium is concentrated by weathering on iron oxide or clay surfaces, coupled with moderate porosity and permeability. The importance of carbonate soils is indicated by the fact that radon contents in 93 percent of a sample of houses built on limestone-dolomite soils near State

College, Centre County, exceeded 4 pCi/L, and 21 percent exceeded 20 pCi/L, even though the uranium values in the underlying bedrock are all in the normal range of 0.5 to 5 ppm uranium.

The second factor listed above is most likely the cause of radon levels in Centre County, although high test results may be a result of multiple factors. Figures 4.3.8-3, 4.3.8-4, 4.3.8-5, and 4.3.8-6 show the radon test data available for Centre County by zip code. As shown in Figure 4.3.8-3, most communities have average basement radon readings of over the threshold of action of 8.0 pCi/L, while many communities had maximum basement readings over 535 pCi/L.

First floor average radon levels were substantially lower than average test results for basement, but many communities still exceeded the 4pCi/L threshold, which is shown in Figure 4.3.8-5. Additionally, maximum first floor radon levels were much lower than those for basements, but all exceeded the threshold of action. Communities with no data available did not have a sufficient sample size.

Figure 4.3.8-2: Radon Hazard Zones in Pennsylvania, 2021

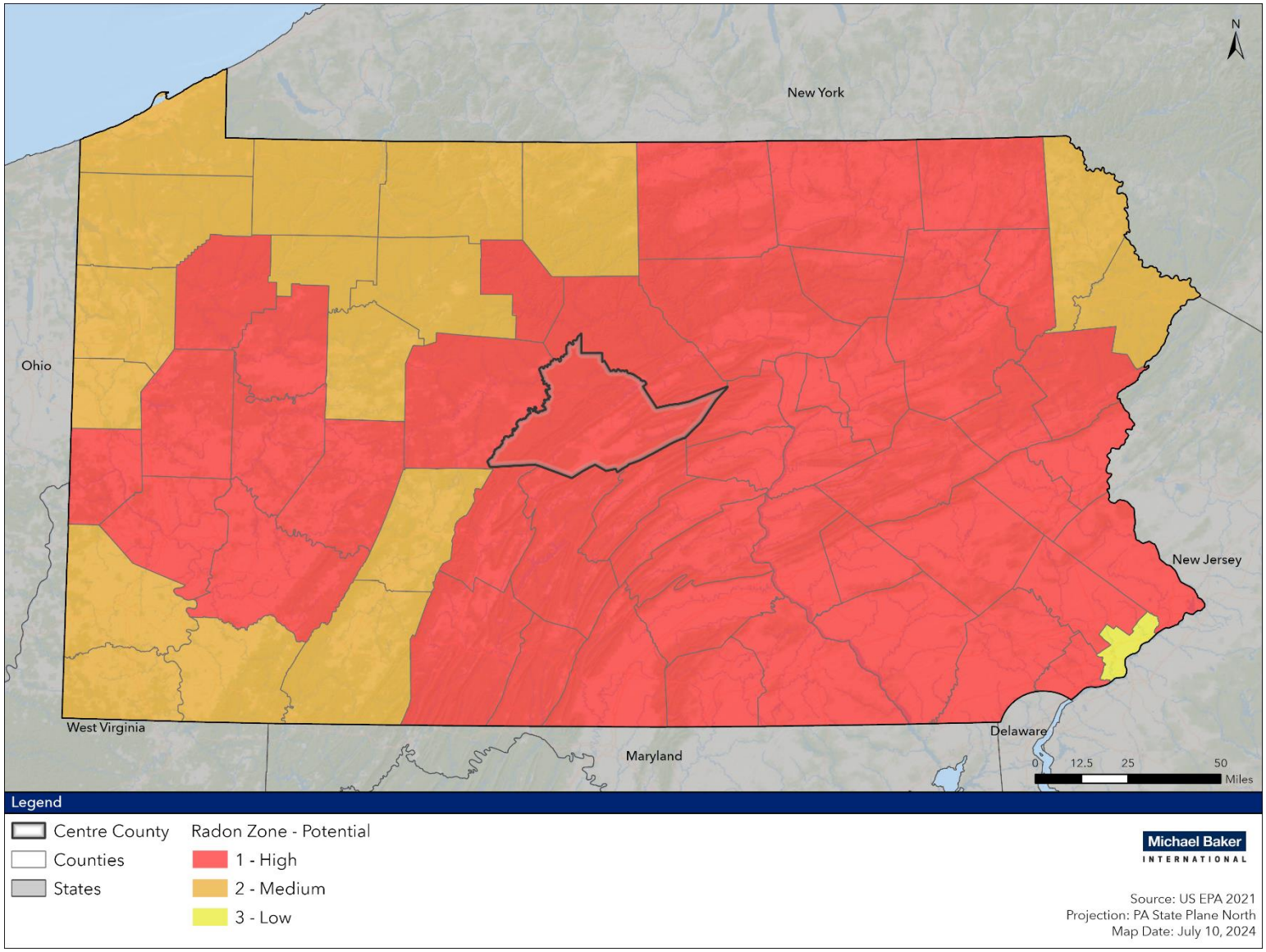


Figure 4.3.8-3: Centre County Average Basement Radon Test Results, 2024

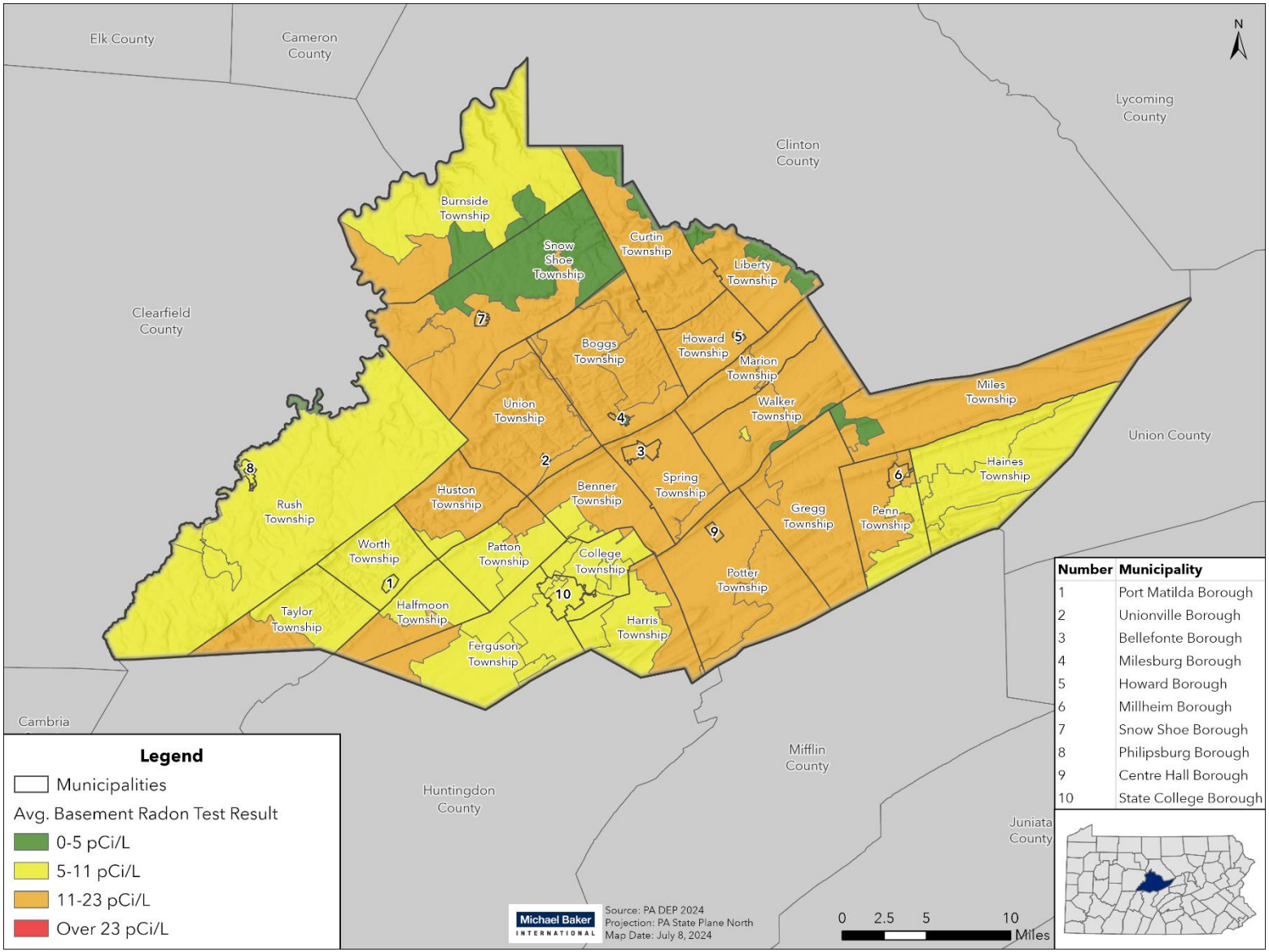


Figure 4.3.8-4: Centre County Maximum Basement Radon Test Results, 2024

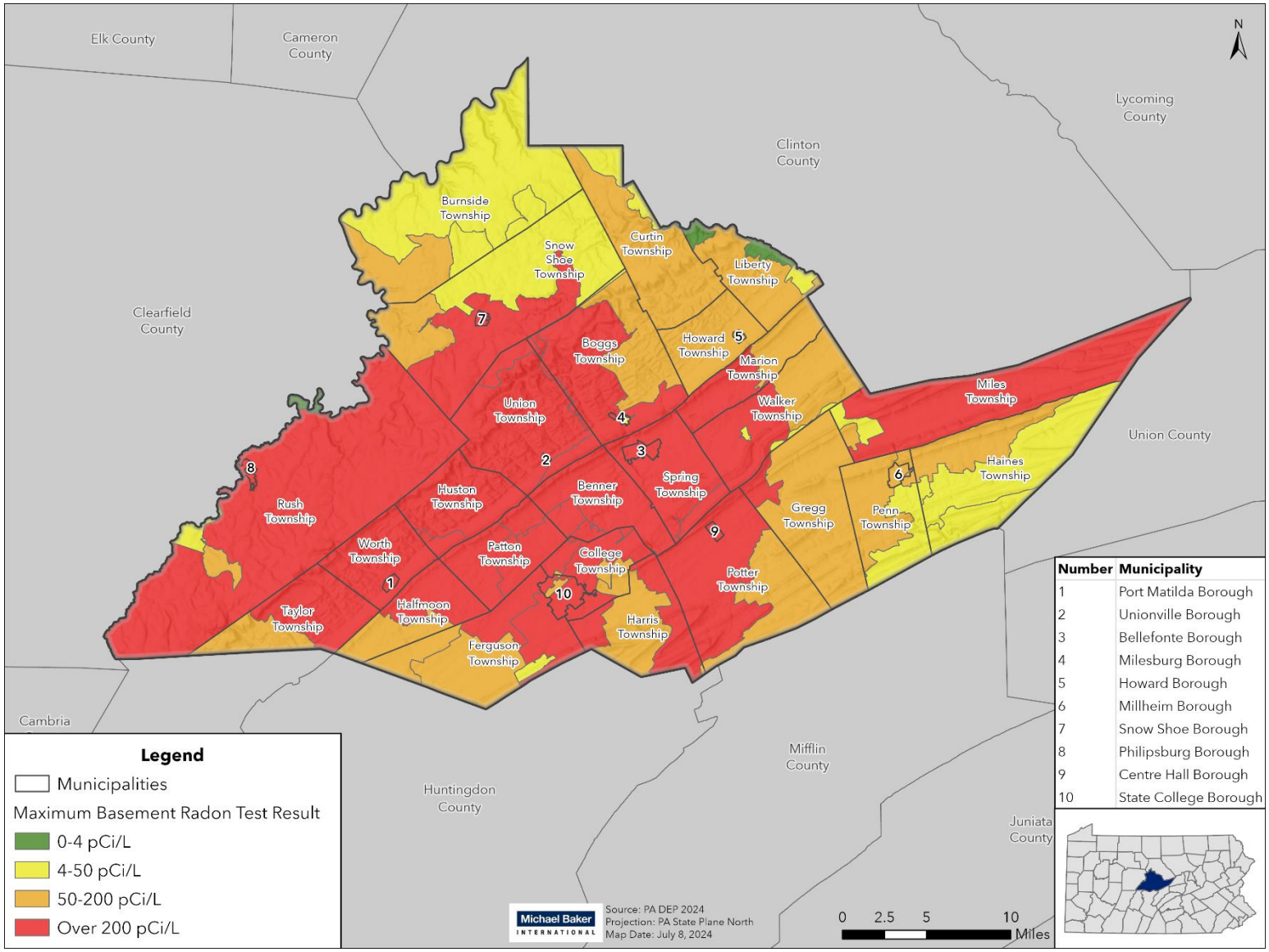


Figure 4.3.8-5: Centre County Average First Floor Radon Test Results, 2024

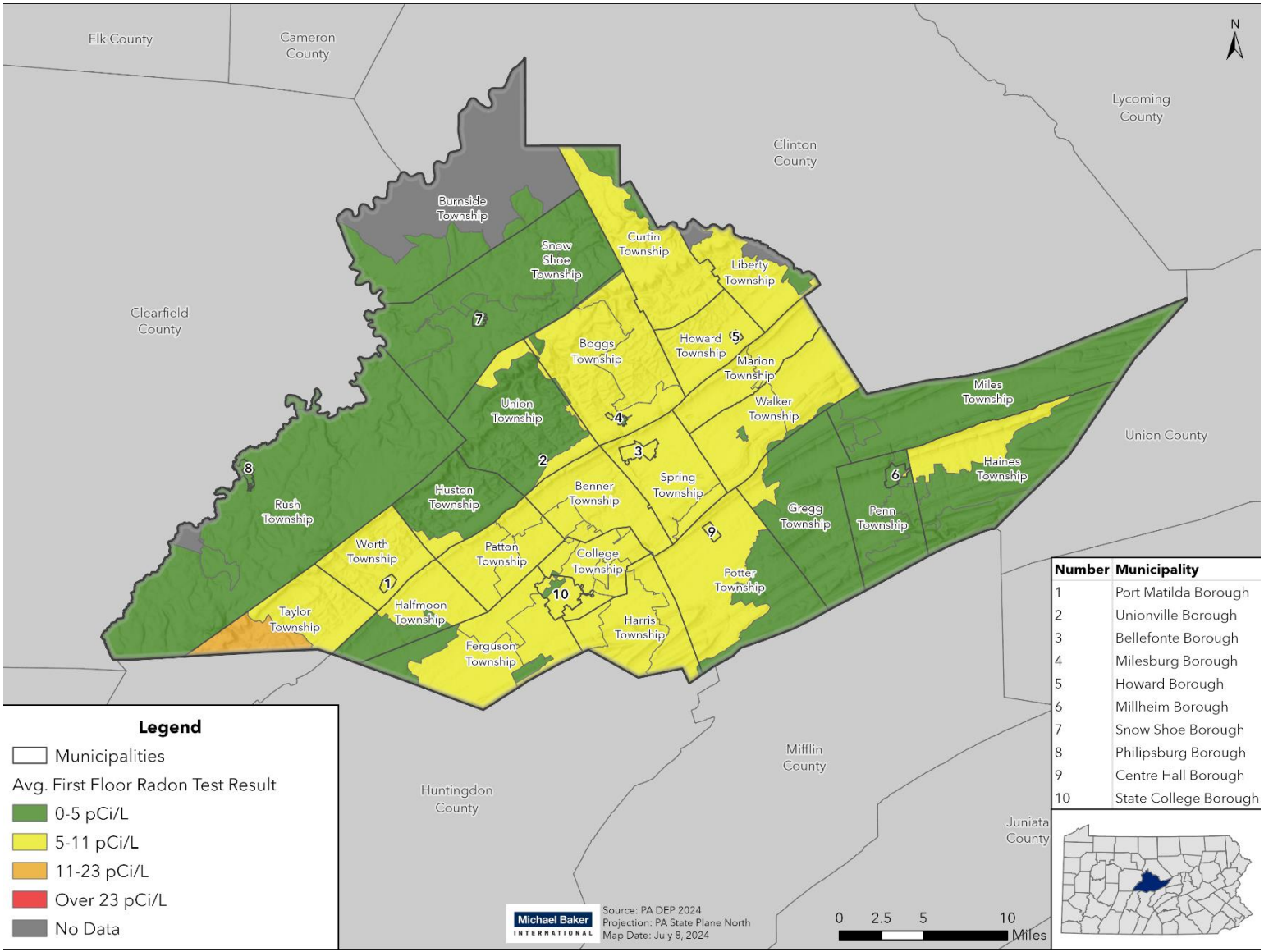
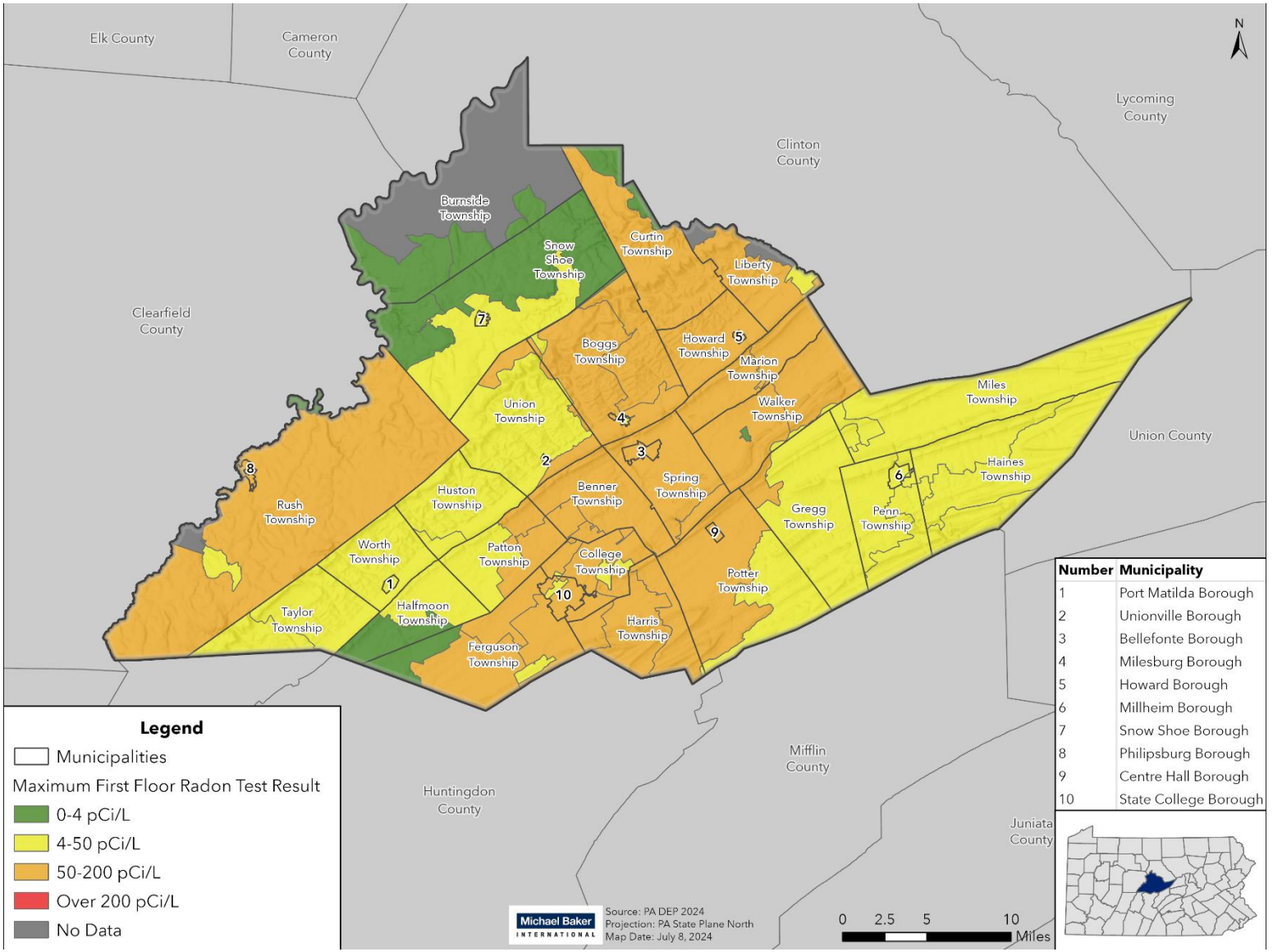


Figure 4.3.8-6: Centre County Maximum First Floor Radon Test Results, 2024



4.3.8.2 Range of Magnitude

Exposure to radon is the second leading cause of lung cancer after smoking. It is the number one cause of lung cancer among non-smokers. Radon is responsible for about 21,000 lung cancer deaths every year; approximately 2,900 of which occur among people who have never smoked. Lung cancer is the only known effect on human health from exposure to radon in air and thus far, there is no evidence that children are at greater risk of lung cancer than are adults The main hazard is actually from the radon daughter products (218Po, 214Pb, 214Bi), which may become attached to lung tissue and induce lung cancer by their radioactive decay (US EPA, 2016).

According to the EPA, the average radon concentration in the indoor air of homes nationwide is about 1.3 pCi/L. The EPA recommends homes be fixed if the radon level is 4 pCi/L or more. However, because there is no known safe level of exposure to radon, the EPA also recommends that Americans consider fixing their home for radon levels between 2 pCi/L and 4 pCi/L (US EPA, 2016). Table 4.3.8-1 shows the relationship between various radon levels, probability of lung cancer, comparable risks from other hazards, and action thresholds. As is shown in Table 4.3.8-1, a smoker exposed to radon has a much higher risk of lung cancer.

Table 4.3.8-1: Radon Risk for Smokers and Non-Smokers (US EPA, 2016)

RADON LEVEL (cCi/L)	IF 1,000 PEOPLE WERE EXPOSED TO THIS LEVEL OVER A LIFETIME…*	RISK OF CANCER FROM RADON EXPOSURE COMPARES TO…**	ACTION THRESHOLD
Smokers			
20	About 260 people could get lung cancer	250 times the risk of drowning	Fix structure
10	About 150 people could get lung cancer	200 times the risk of dying in a home fire	
8	About 120 people could get lung cancer	30 times the risk of dying in a fall	
4	About 62 people could get lung cancer	5 times the risk of dying in a car crash	
2	About 32 people could get lung cancer	6 times the risk of dying from poison	Consider fixing structure between 2 and 4 pci/l
1.3	About 20 people could get lung cancer	(Average indoor radon level)	Reducing radon levels 2pci/l is difficult
0.4	About 3 people could get lung cancer	(Average outdoor radon level)	
Non-Smokers			
20	About 36 people could	35 times the risk	Fix structure

Table 4.3.8-1: Radon Risk for Smokers and Non-Smokers (US EPA, 2016)

RADON LEVEL (cCi/L)	IF 1,000 PEOPLE WERE EXPOSED TO THIS LEVEL OVER A LIFETIME…*	RISK OF CANCER FROM RADON EXPOSURE COMPARES TO…**	ACTION THRESHOLD
	get lung cancer	of drowning	
10	About 18 people could get lung cancer	20 times the risk of dying in a home fire	
8	About 15 people could get lung cancer	4 times the risk of dying in a fall	
4	About 7 people could get lung cancer	The risk of dying in a car crash	
2	About 4 people could get lung cancer	The risk of dying from poison	Consider fixing structure between 2 and 4 pci/l
1.3	About 2 people could get lung cancer	(Average indoor radon level)	Reducing radon levels below 2pci/l is difficult
0.4	-	(Average outdoor radon level)	

Note: Risk may be lower for former smokers.

* Lifetime risk of lung cancer deaths from EPA Assessment of Risks from Radon in Homes (EPA 402-R-03-003).

** Comparison data calculated using the Centers for Disease Control and Prevention's 1999-2001 National Center for Injury Prevention and Control Reports.

The worst-case scenario for radon exposure would be that a large area of tightly sealed homes provided residents high levels of exposure over a prolonged period of time without the resident being aware. This worst-case scenario exposure then could lead to a large number of people with cancer attributed to the radon exposure.

The potential impacts of radon exposure community lifelines are as follows:

Table 4.3.8-2: Most Likely Lifelines Impacted by Radon Exposure

LIFELINES	NOTES
	Direct exposure to radon can pose serious health risks and impact the safety of the community.
	Shelters may be at risk if exposed to radon.

Table 4.3.8-2: Most Likely Lifelines Impacted by Radon Exposure

LIFELINES	NOTES
	Exposure will increase the chances of lung cancer-causing potential increase in the amount of services and resources needed if communities develop more instances of cancer.

4.3.8.3 Past Occurrence

Current data on abundance and distribution of radon as it affects individual houses in the state of Pennsylvania in general is considered incomplete and potentially biased. Centre County is no exception. The EPA has estimated that the national average indoor radon concentration is 1.3 pCi/L and the level for action is 4.0 pCi/L; however they have estimated that the average indoor concentration in Pennsylvania basements is about 7.1 pCi/L and 3.6 pCi/L on the first floor (PA DEP, 2019).

The PA DEP Bureau of Radiation Protection provides information for homeowners on how to test for radon in their houses. If a test results in radon concentrations over 4 pCi/L, then the Bureau works to help the homeowners make repairs to their houses to mitigate against high radon levels. The total number tests reported to the Bureau since 1990 and their results are provided by zip code on the Bureau's website. However, this information is only provided if over 30 tests total were reported in order to best approximate the average for the area.

In Centre County, 20 zip codes had sufficient tests reported to the Bureau to list their findings, which are shown in Table 4.3.8-3. This table does not include the ZIP codes for which insufficient data was collected in both basements and first floors.

Table 4.3.8-3: Radon Level Tests and Results in Centre County Zip Codes (PA DEP, 2024c)

ZIP CODE	AREA OF CENTRE COUNTY	BASEMENT			FIRST FLOOR		
		NUMBER OF TESTS	MAXIMUM RESULT (pCi/L)	AVERAGE RESULT (pCi/L)	NUMBER OF TESTS	MAXIMUM RESULT (pCi/L)	AVERAGE RESULT (pCi/L)
16801	State College	13,826	535.6	9.8	1598	57	6.3
16802	State College	64	57.6	8.2	24	9.2	2.3
16803	State College	8028	206	8.7	1424	79.3	5.1
16820	Haines Township	112	59.8	9.8	18	16.1	6.8

Table 4.3.8-3: Radon Level Tests and Results in Centre County Zip Codes (PA DEP, 2024c)

ZIP CODE	AREA OF CENTRE COUNTY	BASEMENT			FIRST FLOOR		
		NUMBER OF TESTS	MAXIMUM RESULT (pCi/L)	AVERAGE RESULT (pCi/L)	NUMBER OF TESTS	MAXIMUM RESULT (pCi/L)	AVERAGE RESULT (pCi/L)
16823	Bellefonte Borough	5907	238.5	12.4	647	67.1	5.0
16826	Liberty Township	74	23.2	4.5	23	13.1	3.8
16827	Harris Township	1980	159	10.0	350	64.64	6.1
16828	Potter Township, Centre Hall Borough	797	249.9	15.5	64	66.5	8.7
16829	Snow Shoe Township	36	20.6	4.9	5	3.7	2.1
16832	Haines Township	29	23	5.6	6	6.2	2.2
16835	Unionville Borough	18	26.6	11.8	1	6.2	6.2
16841	Howard Township	461	123	12.6	85	84.9	5.5
16844	Union Township	269	256.6	12.1	55	13.4	3.5
16845	Burnside Township	1	7.1	7.1			
16851	College Township	448	59.1	8.0	41	17	5.5
16852	Miles Township	15	12.5	4.7	11	7.1	4.5
16853	Milesburg Borough	57	17.5	5.0	14	10.4	3.6
16854	Millheim Borough	114	159	12.1	19	10.9	3.4
16856	Walker Township	18	15.1	5.0	2	1.1	0.8
16859	Burnside Township	23	61.9	11.5	2	1.8	1.6

Table 4.3.8-3: Radon Level Tests and Results in Centre County Zip Codes (PA DEP, 2024c)

ZIP CODE	AREA OF CENTRE COUNTY	BASEMENT			FIRST FLOOR		
		NUMBER OF TESTS	MAXIMUM RESULT (pCi/L)	AVERAGE RESULT (pCi/L)	NUMBER OF TESTS	MAXIMUM RESULT (pCi/L)	AVERAGE RESULT (pCi/L)
16864	Curtin Township	2	5.1	4.8	1	1.7	1.7
16865	Ferguson Township	488	110.5	10.4	50	50.4	5.6
16866	Rush Township	666	504	9.3	130	93.8	4.2
16868	Ferguson Township	280	48.8	9.0	45	30.6	3.4
16870	Port Matilda	2616	246.1	10.9	133	33.2	5.1
16872	Miles Township	66	254.3	15.7	12	9	3.3
16874	Snowshoe Township	75	224.9	11.6	19	8.8	2.7
16875	Gregg Township	490	194.8	14.4	58	21	5.0
16877	Halfmoon Township	29	119.4	15.8	4	3.3	2.1
16882	Haines Township	31	31.2	7.2	12	9.3	3.7

4.3.8.4 Future Occurrence

Radon exposure retains a significant probability given present soil, geologic, and geomorphic factors in Centre County. Future occurrence of high radon level hazards can be considered *possible* as defined by the Risk Factor Methodology probability criteria (see Table 4.4-1). Development in areas where previous radon levels have been significantly high will continue to be more susceptible to exposure. However, new incidents of concentrated exposure may occur with future development or deterioration of older structures. Exposure can be limited with proper testing for both past and future development and appropriate mitigation measures.

Climate change and radon exposure, though distinct issues, intersect in ways that can influence public health. As climate change alters precipitation patterns and increases the frequency of extreme weather events, soil moisture levels fluctuate, which can impact radon release from the ground. Drier conditions can enhance radon migration

into homes, while wetter soils might impede it. Additionally, rising temperatures often lead to increased use of air conditioning and improved home insulation, resulting in tightly sealed buildings with reduced ventilation. This can trap radon indoors, elevating exposure risks. Extreme weather events, such as heavy rainfall or flooding, can damage building foundations and radon mitigation systems, creating new pathways for radon entry and necessitating repairs. Addressing these intertwined challenges requires integrating radon mitigation into climate adaptation strategies, ensuring that efforts to improve energy efficiency and building resilience also consider radon risk reduction.

4.3.8.5 Vulnerability Assessment

Structures in Centre County, particularly in high vulnerability areas as shown in Figures 4.3.8-3 and 4.3.8-4, could be susceptible to moderate levels of radon.



Figure 4.3.8-7: Radon System Manometer in Basement (Scott Home Inspection, 2017) (IRadon, 2024)

Smokers can be up to ten times more vulnerable to lung cancer from high levels of radon depending on the level of radon they are exposed to. Older houses that have crawl spaces or unfinished basements are more vulnerable as well because of the increased exposure to soils which could be releasing higher levels of radon gas. Additionally, houses that rely on wells for their water may face an additional risk, although this type of exposure is low and rare in Pennsylvania (US EPA,2016).



Figure 4.3.8-8: Radon Mitigation Systems (Scott Home Inspection, 2017) (IRadon, 2024)

Proper testing for radon levels should be completed throughout Centre County, especially in the areas of higher incidence levels and for vulnerable populations that face the contributing risks described above. This testing will determine the level of vulnerability that residents face in their homes, as well as in their businesses and schools.

The EPA determines that an average radon mitigation system costs $1,000. The EPA also states that current state surveys show that one home in five has elevated radon levels. Using this methodology, radon loss estimation is factored by assuming that 20 percent of the buildings within the zip codes with elevated rest results have elevated radon values and each would

require a radon mitigation system installed at the EPA estimated average of $1,000.

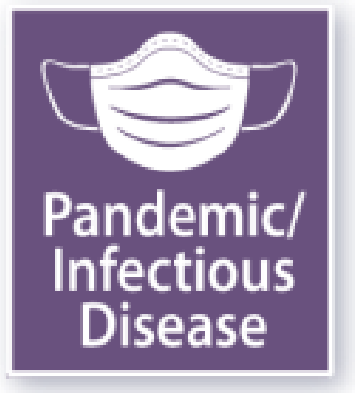
According to the Pennsylvania State Hazard Mitigation Plan, Centre County has 52,069 buildings in areas with high radon test results, while approximately 20 percent, or 10,414, of these buildings will be impacted. The estimated costs for radon mitigation totaled $12,496,560.

Radon exposure has minimal environmental impacts. Due to the relatively short half-life of radon, it tends to only affect living and breathing organisms such as humans or pets which are routinely in contained areas (i.e. basement or house) where the gas is released.

4.3.8.6 Equity in Vulnerable Communities

Communities with an aged housing stock are the most likely to be exposed to radon exposure as radon creeps in through poor foundations or ventilation systems. Low-income communities are more likely to have aged housing stock, so proper awareness is essential. This includes State College Borough, Bellefonte Borough, and Ferguson Township as they have areas with the highest populations below the poverty level. Public awareness materials should also be provided in secondary languages in municipalities such as State College Borough, Patton Township, College Township, and Miles Township who have higher concentrations of households with limited English. Low-income communities may also be at an increased risk as home repairs, testing kits, and mitigation systems are significant financial investments. Additionally, those who live in rural areas, where geological conditions may lead to higher radon levels, are at an increased risk.

4.3.9 Pandemic and Infectious Disease



4.3.9.1 Location and Extent

Pandemic is defined as a disease affecting or attacking the population of an extensive region, including several countries, and/or continent(s). It is further described as extensively epidemic. Generally, pandemic diseases cause sudden, pervasive illness in all age groups on a global scale. Infectious diseases are also highly virulent but are not spread person-to-person.

Pandemic and infectious disease events cover a wide geographical area and can affect large populations, potentially including the entire population of the County. The exact size and extent of an infected population is dependent upon how easily the illness is spread, the mode of transmission and the amount of contact between infected and uninfected individuals. The transmission rates of pandemic illnesses are often higher in denser areas where there are large concentrations of people. The transmission rate of infectious disease will depend on the mode of transmission of a given illness. Pandemic events can also occur after other natural disasters, particularly floods, when there is the potential for bacteria to grow and contaminate water.

Centre County is primarily concerned with the possibility of a pandemic flu outbreak. Influenza, also known as "the flu", is a contagious disease that is caused by the influenza virus and most commonly attacks the respiratory tract in humans. Influenza is considered to have pandemic potential if it is novel, meaning that people have no immunity to it, virulent, meaning that it causes deaths in normally healthy individuals, and easily transmittable from person-to-person (CDC,2024).

Different strands of influenza mutate over time and replace older stands of the virus and thus have drastically different effects. The H1N1 virus, colloquially known as swine flu, is of particular concern. This virus was first detected in people in the United States in April 2009. On June 11, 2009, the World Health Organization signaled that a pandemic of 2009 H1N1 flu was underway (CDC, 2009a). Avian influenza, also known as bird flu, infects birds. A recent strain, H5N1, has caused particular concern due to its ability to pass from wild birds to poultry then on to people. This virus has killed more than half of the people infected with it, although the avian flu is less likely to infect humans (Mayo Clinic, 2024).

Meningitis is also a concern in Centre County because of the large student population at Penn State University. Meningitis is caused by the inflammation of the membranes that protect the brain and spinal cord. Meningitis typically develops as result of bacterial or viral infections, although it can also be caused by cancer, certain drugs, and physical

injuries (CDC,2024). Bacterial meningitis is contagious and can be spread through respiration secretions (expelled when a person coughs, sneezes, talks, or laughs) and throat secretions. Viral meningitis on the other hand is much less likely to be spread through these means; however, close contact with a person who has viral meningitis can cause an individual to become infected with the virus that caused the meningitis. Fungal meningitis is caused by fungi and is usually acquired by inhaling fungal spores, although it is not contagious.

At the time of the last HMP update, a novel coronavirus spread into a worldwide pandemic. Named COVID-19, this type of coronavirus is a new virus that causes respiratory illness and is extremely contagious. Flu-like in nature, symptoms of the virus include fever, cough, shortness of breath, and diarrhea. This virus became a great concern due to its high rates of transmission, in addition to so little being known about it. People were advised to practice social distancing; only leaving the house for essentials like grocery shopping, and no gathering even in small groups. Even when going on walks, people should remain six feet apart to slow the spread of transmission.

4.3.9.2 Range of Magnitude

The magnitude of a pandemic or infectious disease threat in Centre County will range significantly depending on the aggressiveness of the virus in question and the ease of transmission. Pandemic influenza is easily transmitted from person-to-person, but advances in medical technologies have greatly reduced the number of deaths caused by influenza over time. The magnitude of a pandemic may be exacerbated by the fact that an influenza pandemic will cause outbreaks across the United States, limiting the ability to transfer assistance from one jurisdiction to another. Additionally, effective preventative and therapeutic measures, including vaccines and other medications, will likely be in short supply or will not be available.

In terms of lives lost, the impact various pandemic influenza outbreaks have had globally over the last century has declined (see Table 4.3.9-2). The severity of illness from the 2009 H1N1 influenza flu virus varied, with the gravest cases occurring mainly among those considered at high risk. High-risk populations considered more vulnerable include children, the elderly, pregnant women, and chronic disease patients with reduced immune system capacity. These populations are described in more detail in Section 4.3.9.5. Most people infected with swine flu in 2009 recovered without needing medical treatment (CDC, 2009b). Unlike a regular flu season, according to the Centers for Disease Control (CDC) the overwhelming majority of the people who died, as many as 77 percent were 18 to 64 years old with up to 11 percent of the deaths estimated in those 17 years old and younger.

The 1918 Spanish flu pandemic was the worst-case pandemic event in the 20th century for both Pennsylvania and worldwide. County data is unavailable, and mortality figures were probably under-reported, it is recorded that 8,000 Pennsylvanians died from the flu or its complications in the first month alone (US DHHS, 2009). Infection rates were much worse in denser cities, which should be a high priority for response actions in future flu events.

An estimate of potential impacts was prepared for the Penn State University Pandemic Response Plan, based upon an influenza pandemic strain three times more lethal than the 1968 pandemic (see Table 4.3.9-1). This is assumed as the worst-case scenario, involving a virus that occurs in a dense campus setting, is easily transmitted between humans, and extremely deadly.

Table 4.3.9-1: Projections of Severe Influenza Impact (Penn State University Pandemic Response Plan)

	Population	Low Severity	Moderate Severity	High Severity
Pennsylvania	**12,406,292**			
Cases		3,004,915	3,004,915	3,004,915
Hospitalizations		37,553	112,658	225,318
Deaths		9,062	27,185	54,369
Centre County	**140,476**			
Cases		35,119	35,119	35,119
Hospitalizations		421	1,264	2,529
Deaths		102	309	818
Penn State Uni.	**42,000**			
Cases		10,500	10,500	10,500
Hospitalizations		126	378	750
Deaths		30	92	185

Avian bird flu hit Pennsylvania in 1983 and 1984, resulting in the loss of 17 million birds, which equated to a loss of $65 million in economic activity (Smith, 2015). An event of a similar scale would be a worst-case scenario for Centre County.

Bacterial meningitis is usually severe. In the United States, cases of bacterial meningitis are on the rise. For all of 2023, 422 cases were reported, the highest annual figure since 2014 (CDC, 2024b). Certain factors can increase risk to bacterial meningitis, including age and certain medical conditions. Similarly, an outbreak of bacterial meningitis on Penn State's campus that resulted in fatalities would be a worst-case scenario for Centre County.

Centre County has faced varying impacts of the COVID-19 pandemic. It is believed that the virus originated in an open-air market in the Wuhan province of China in November 2019. Shortly afterwards, the virus began to spread to nearby countries like Japan and South Korea. By March 2020, the virus had reached almost every country worldwide, with the most cases in the United States. At first, concern was focused on people who might be infected due to recent travel. However, community infections soon began to crop up in many cities and towns. This led to a statewide shutdown of schools and businesses and the cancellation of large events for Spring and Summer 2020. Only life sustaining services were permitted to remain open, including medical facilities, pharmacies, and grocery stores. People were advised to remain home as much as possible in attempt to slow the transmission of COVID-19. State health officials note that the virus has infected all age ranges at about the same rate, and that no age group can be considered more or less vulnerable to infection. (CDC, 2024c) After Penn State University students returned to campus in late August 2020, cases quickly rose in Centre County again. This prompted the Pennsylvania Department of Health to open a free pop-up testing site (Rushton, 2020).

At the end of 2020, the first COVID-19 vaccine for emergency use was authorized by the EPA and by March 2021 more than 100 million COVID-19 vaccine doses had been administered. (CDC, 2024c) While the Federal Public Health Emergency for COVID-19 expired on May 11th, 2023, new variants have begun to pop up and case levels remain significant nationwide (US DHHS,2024).

The potential impacts of pandemic and infectious diseases:

Table 4.3.9-2: Most Likely Lifelines Impacted by Pandemic and Infectious Diseases

LIFELINES	NOTES
	Government services and administration will be significantly impacted by widespread disease. Response plans will need to be developed.
	Staffing issues may occur due to illness at various points in the food supply chain.
	Hospitals will be impacted through staffing issues, an increase in patients, and supply chain issues as the disease becomes more widespread.

4.3.9.3 Past Occurrence

The United States Department of Health and Human Services estimates that influenza pandemics have occurred for at least 300 years at unpredictable intervals. There have been several pandemic influenza outbreaks over the past 100 years. A list of events and worldwide deaths are shown in Table 4.3.9-3.

Table 4.3.9-3: Significant Influenza Outbreaks over the Past Century (Global Security, 2009; WHO, 2009)

DATE	PANDEMIC	WORLDWIDE DEATHS (APPROXIMATE)
1918-1920	Spanish Flu/H1N1	50 million
1957-1958	Asian Flu/H2N2	1.5-2 million
1968-1969	Hong Kong Flu/H3N2	1 million
2009-2010	Swine Flu/H1N1	12,000

Deaths occurred in the United States as a result of the Spanish Flu, Asian Flu, and Hong Kong Flu outbreaks. The Spanish Flu claimed 500,000 lives in the United States. There were 350,000 cases and 8,000 deaths in Pennsylvania. Most deaths resulting from the Asian flu occurred between September 1957 and March 1958; there were about 70,000 deaths in the United States and approximately 15 percent of the population of Pennsylvania was affected. The first cases of the Hong Kong Flu in the United States were detected in September of 1968 with deaths peaking between December 1968 and January 1969 (Global Security, 2009).

In the 2009/2010 season, when H1N1 was a primary concern, there were 378 confirmed flu cases in Centre County, one of the highest amounts of reported cases in a county in Pennsylvania. According to the Pennsylvania Department of Health (PA DOH), the most recent intense influenza season, the 2012/2013 season which began earlier than most flu seasons, there were 826 confirmed flu cases in Centre County (PA DOH, 2014). Table 4.3.9-4 lists the number of seasonal flu cases in Centre County from the 2014/2015 flu season.

Table 4.3.9-4: Number of Flu Cases in Centre County by Flu Season (PA DOH, 2020a)

Flu Season	# of Cases
2014/2015	786
2015/2016	547
2016/2017	988
2017/2018	2237
2018/2019	1854
2019/2020	2247

Table 4.3.9-4: Number of Flu Cases in Centre County by Flu Season (PA DOH, 2020a)

Flu Season	# of Cases
2020/2021	Insufficient Data
2021/2022	1739
2022/2023	2489

*Insufficient data for the 2020/2021 flu season due to abnormally low influenza activity most likely due to COVID-19 mitigation measures

An avian flu outbreak in Pennsylvania occurred in 1983 through1984, in which 17 million birds were lost. There has not been an outbreak since in the Commonwealth, although there have recently been outbreaks in the Midwest. From 1996 to 1997, a number of table-egg farms in Lancaster and Lebanon Counties tested positive for H7N2 avian influenza. As a result, nine flocks were lost, and the Pennsylvania Department of Agriculture (PADA) imposed a quarantine on a 75-square-mile area restricting movement of poultry or poultry products into or out of the area (Jacob et al., 1998).

In 2012, there was a multi-state outbreak of fungal meningitis among patients who received contaminated preservation-free steroid injections from a medical facility in Massachusetts. There have been numerous meningitis outbreaks on college campuses in recent years: eight students were infected with bacterial meningitis at Princeton University in 2013 and 20 cases of viral meningitis were reported at the University of Maryland. Additionally, one San Diego University student died after diagnosed with bacterial meningitis in 2014.

The COVID-19 outbreak began in China in November 2019. The virus reached the United States in late February 2020, and most counties in Pennsylvania were affected by March 2020. By October 1, 2020, there were more than 162,140 confirmed cases in Pennsylvania, with almost 3,000 cases and 12 deaths reported in Centre County (PA DOH, 2020b). County sources note that case numbers quickly rose as college students came back to the Penn State University main campus in late August. Nearly 2,300 cases were reported in September 2020. The new cases totaled about two and half times more than the total cases from March through August combined. As shown in Table 4.3.9-5, the number of cases continued to rise at a steady rate until they eventually peaked in the spring of 2021.

Table 4.3.9-5: Cumulative COVID-19 Cases and Total Deaths in Centre County 2020-2023 (PA DOH, 2020b) (PA Open Data, 2024)

DATE	CUMULATIVE CASES	TOTAL DEATHS
March 31, 2020	36	0
April 30, 2020	105	1

Table 4.3.9-5: Cumulative COVID-19 Cases and Total Deaths in Centre County 2020-2023 (PA DOH, 2020b) (PA Open Data, 2024)

DATE	CUMULATIVE CASES	TOTAL DEATHS
May 31, 2020	160	6
June 30, 2020	211	8
July 31, 2020	361	10
August 31, 2020	509	11
September 30, 2020	2,847	12
October 31, 2020	4,271	22
November 30, 2020	6,407	85
December 31, 2020	9,096	155
January 31, 2021	11,429	198
February 28,2021	13,260	212
March 31, 2021	14,973	216
April 30, 2021	16,714	222
May 31, 2021	17,089	226
June 30, 2021	17,169	229
July 31, 2021	17,337	230
August 31, 2021	17,998	232
September 30, 2021	19,766	236
October 31, 2021	21,124	249
November 30, 2021	22,911	266
December 31, 2021	26,501	298
January 31, 2022	33,396	332
February 28, 2022	34,724	349
March 31, 2022	35,079	352
April 30, 2022	35,655	353
May 31, 2022	37,076	359
June 30, 2022	37,921	361
july 31, 2022	38,962	363
August 31, 2022	40,197	368
September 30, 2022	41,304	373
October 31, 2022	41,881	377
November 30, 2022	42,395	381
December 31, 2022	43,014	386
January 31, 2023	43,546	394
February 28, 2023	44,098	397
March 31, 2023	44,497	402
April 30, 2023	44,262	405
May 31, 2023	44,757	406
June 15, 2023	44,785	406

This upsurge in Fall 2020 led the PA DOH to open a free COVID testing site at Nittany Mall, which could test up to 500 individuals for free each day regardless of signs or symptoms (Rushton, 2020). The test site was funded through CARES Act funds received by the County. Case numbers were expected to continue to peak in May 2020, however, the Commonwealth is still experiencing challenges with the COVID pandemic. While those who tested positive were isolating in their homes, county officials urged the entire population to isolate and act as if the virus is everywhere.

4.3.9.4 Future Occurrence

Future occurrences of pandemics and infectious diseases are unclear. The precise timing of pandemic influenza is uncertain, but occurrences are most likely when the Influenza Type A virus makes a dramatic change, or antigenic shift, that results in a new or "novel" virus to which the population has no immunity. This emergence of a novel virus is the first step toward a pandemic. Future pandemics may also emerge from other diseases, especially invasive pathogens that Pennsylvanians do not have natural immunity to. While it is unlikely that pandemics and infectious diseases will affect the county, this hazard occurred recently in Spring 2020. It is impossible to predict this type of hazard. The best form of county response is to expect that these events can occur at any time and to constantly evaluate resources and update emergency response plans. There is no anticipated impact from climate change on this hazard's occurrence or magnitude.

Looking at the number of historical incidences of pandemic-potential diseases, the probability of future pandemic events can be considered *possible* according to the Risk Factor Methodology (see Table 4.4-1).

4.3.9.5 Vulnerability Assessment

Schools and major universities are particularly vulnerable to the spread of disease due to the presence of large population groups in relatively close confinement. While Penn State University is particularly vulnerable to influenza and meningitis, in response to a previous avian flu (H5N1) outbreak, the University has adopted a Pandemic Response Plan. The plan recognizes that preparedness for one particular strain of influenza will also benefit in preparation for future pandemic influenza strains or another sort of public health disaster such as SARS, smallpox, or anthrax.

At Penn State University, the planning for pandemic influenza occurs within the context of University-wide emergency planning and preparedness. Each administrative unit and academic department will respond to an infectious disease pandemic initially as they would to any emergency – with a concern for protection of human life and safety first and then for continuity of University operations, including continuity of instruction, research and graduate education. To the extent possible, the response should be

guided by carefully planned procedures and protocols, recognizing that any emergency will also demand flexibility and agility in a rapidly evolving situation. Response actions include the suspension of classes and quarantine of students as needed. These actions were used in March 2020 in response to the COVID-19 outbreak.

Certain population groups are at higher risk of pandemic flu infection. This population group includes people 65 years and older, children younger than five years old, pregnant women, and people of any age with certain chronic medical conditions. Such conditions include but are not limited to diabetes, heart disease, asthma and kidney disease (CDC, 2024b). Schools, colleges, convalescent centers, and other institutions serving those younger than five years old and older than 65 years old, are locations conducive to faster transmission of pandemic influenza since populations identified as being at high risk are concentrated at these facilities or because of a large number of people living in close quarters. All communities in Centre County are considered vulnerable to a pandemic event, with the likely greatest impact in terms of population affected and disruption of economic activity occurring at the Penn State University campus in State College Borough and surrounding College Township. There are some occupation-specific risks that may make some employees more vulnerable. For example, those working in direct patient care situations are more likely to be exposed to a pandemic disease.

There are no true environmental impacts of pandemics and infectious disease threats, but there will be significant economic and social costs beyond the possibility of disease-related deaths. Widespread illness may increase the likelihood of shortages of personnel to perform essential community services. In addition, high rates of illness and worker absenteeism occur within the business community, and these contribute to social and economic disruption. Social and economic disruptions could be temporary but may be amplified in today's closely interrelated and interdependent systems of trade and commerce. Social disruption may be greatest when rates of absenteeism impair essential services, such as power, transportation, and communications.

Jurisdictional losses in a pandemic or infectious disease outbreak stem from lost wages and productivity, not losses to buildings or land. Losses are difficult to estimate because the exact rates of absenteeism and cost of treating a widespread disease will depend on the virus or bacterium in question, the availability of vaccination or treatment, and the severity of symptoms. For historical context, though, the Asian and Hong Kong Flu pandemics killed over 1.5 million people worldwide and caused an estimated $32 billion loss due to lost productivity and medical expenses (Saunders-Hastings & Krewski, 2016). With Pennsylvania's economy so integral to the national economy, economic losses from a pandemic or infectious disease threat could be significant. An avian flu outbreak could cause some economic loss for poultry farmers in Centre County.

According to the 2022 Agricultural Census, livestock sales make up two-thirds of Centre County's agricultural sales. Poultry and egg sales totaled around $2,554,00 in 2022.

It is expected that there will be immense losses due to the COVID-19 pandemic. Thousands of individuals were laid off across the commonwealth as non-essential businesses were forced to close. In just one week, over three million Americans filed for unemployment; the greatest amount ever. There is specific concern for those who worked in service and hospitality industries. Construction projects and other businesses are in limbo, while many others decide to permanently close. However, the commonwealth and the federal government are releasing relief packages for individuals and businesses. It is currently unknown how COVID-19 will change the economic environment.



Figure 4.3.9-1: COVID Test Site Opens in Centre County (Parish, 2020)

4.3.9.6 Equity in Vulnerable Communities

Equity considerations during pandemics and infectious disease outbreaks are crucial as there are a number of populations at an increased risk. Low-income populations are more likely to lack access to quality healthcare and have pre-existing health conditions. Furthermore, these populations may be unable to follow quarantine measures as they are essential workers. This includes State College Borough, Bellefonte Borough, and Ferguson Township as they have areas with the highest populations below the poverty level. In addition, Penn Township, Haines Township, Miles Township, Marion Township, and Walker Township have the highest concentration of people without health insurance. Populations of people 65 and older are overall more susceptible to severe outcomes related to infectious disease, especially those currently residing within congregate care facilities. This would add Rush Township, Patton Township, Potter Township, Centre Hall Borough, and Gregg Township to municipalities that may be particularly vulnerable. The HMP will address congregate care facilities with regard to risk identification, capability, and mitigation action with respect to COVID-19 impacts on residents. Households with inadequate broadband connection will have inequitable access to both remote work and remote learning. Having measures and protections in place for these groups is essential to mitigate and reduce the extensivity of this hazard.

4.3.10 Subsidence, Sinkhole



4.3.10.1 Location and Extent

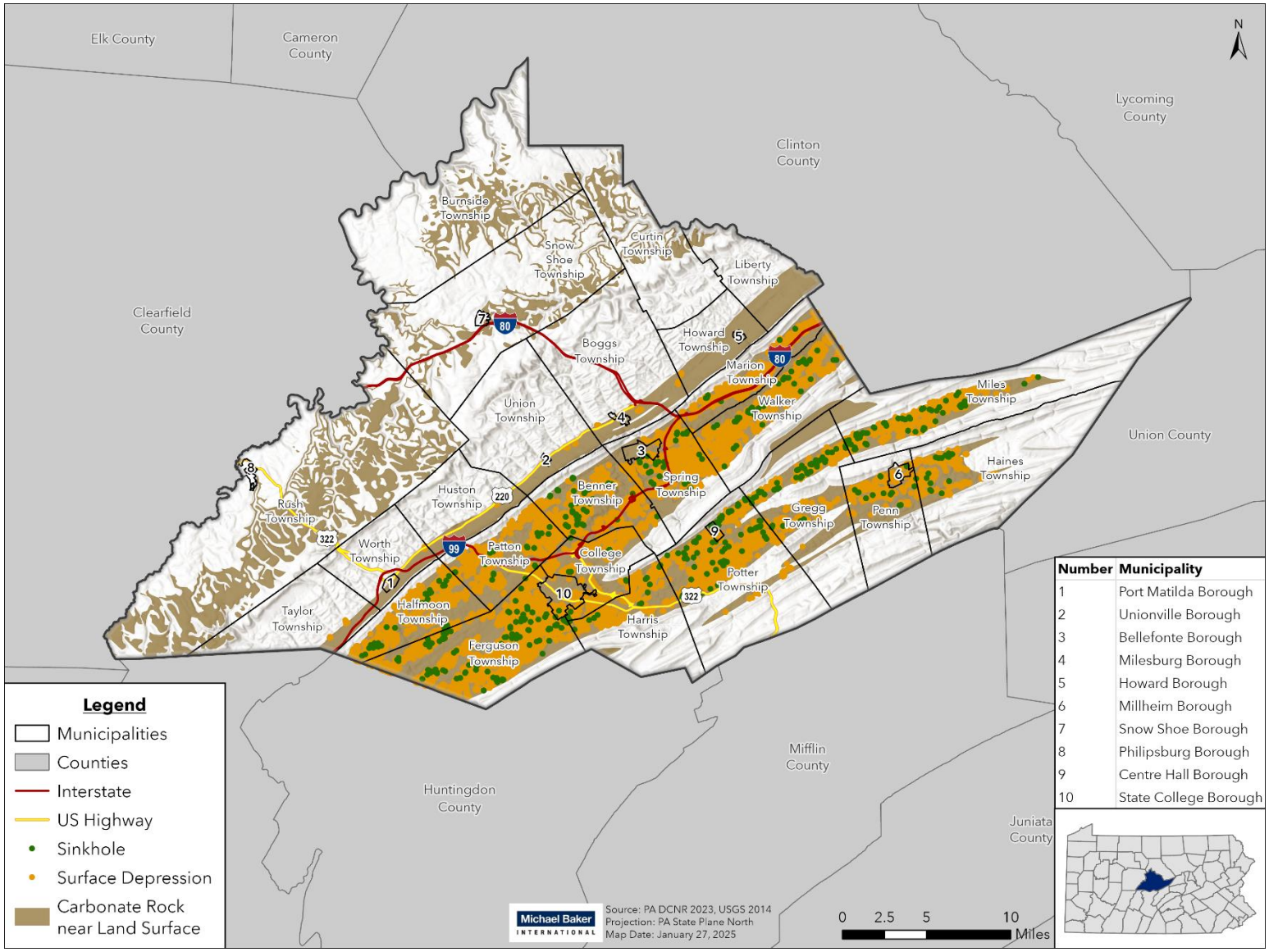
Subsidence is the gradual or sudden caving in or sinking of land. Subsidence is caused by geological factors; human actions can exacerbate the natural causes of subsidence to increase the likelihood of an event occurrence. Much of the County is made up of limestone valleys susceptible to sinkholes, also known as karst topography. Natural subsidence results from water movement through a limestone terrain causing swales or sinkholes. Water passing through naturally occurring fractures and bedding planes dissolve the limestone bedrock leaving voids below the surface.

Eventually, overburden on top of the voids collapse, leaving sinkholes, surface depressions, and caves. (DCNR, 2020b) Often, sub-surface solution of limestone will not result in the immediate formation of karst features. Collapse sometimes occurs only after a large amount of activity, or when a heavy burden is placed on the overlying material. Abrupt or long-term changes in the ground surface may also occur following sub-surface fluid extraction (e.g. natural gas, water, oil, etc.) (DCNR,202b).

Figure 4.3.10-1 shows that much of Centre County lies in an area of Pennsylvania where limestone is present near ground surface, thus making it most susceptible to natural sinkhole development. The USGS dataset from 2014 showing limestone location is the most recent, comprehensive, and publicly available source. These conditions are anticipated to be consistent in 2025 as changes to geological features occur over a significantly greater timespan. The map also includes known sinkhole and surface depression locations and larger towns and cities that are adjacent to these areas.

Centre County has a history of subsidence due to natural conditions and past mining activities. Areas underlain by coal or other minerals which use deep mining techniques may become susceptible to subsidence (DCNR, 2020b). There has been no accurate mapping of past underground mining, making it difficult to predict where mine-related subsidence might occur. Sinkholes are most likely to form following high run-off periods in the spring and fall seasons. Broken water lines and ruptured underground water tanks can also create the conditions for sinkhole occurrences. Sinkholes of varying sizes have been reported in many areas of Centre County's large limestone valleys, including residential areas outside State College and in the Philipsburg area, where a collapsed home was reported in 1974.

Figure 4.3.10-1: Areas Susceptible to Subsidence in Centre County, 2023



4.3.10.2 Range of Magnitude

Based on the geologic formations underlying much of Centre County, subsidence and sinkhole events may occur gradually or abruptly. Events could result in minor elevation changes or deep, gaping holes in the ground surface. Subsidence and sinkhole events can cause severe damage in urban environments, although gradual events can be addressed before significant damage occurs. If long-term subsidence or sinkhole formation is not recognized and mitigation measures are not implemented, fractures or complete collapse of building foundations and roadways may result. In 2001, the worst-case sinkhole event occurred when there was a mine roof collapse at a Spring Township limestone mine that required a search and rescue team response.

The following impacts of subsidence and sinkholes on community lifelines are as follows:

Table 4.3.10-1: Most Likely Lifelines Impacted by Subsidence and Sinkholes

LIFELINES	NOTES
	Safety concerns related to sinkholes and subsidence as they have the potential to cause significant harm. Mitigation should be focused on increasing residents' knowledge of risks in their area.
	Significant damage to homes, disruption of water utility services, and potential groundwater contamination may occur.
	Direct damage to transportation infrastructure may occur depending on the location of the hazard.

4.3.10.3 Past Occurrence

Centre County does not have a record of a significant subsidence-based disaster. PA DCNR's online sinkhole database lists 546 sinkholes identified across the County since 1985. Some of these sinkholes have been filled. Table 4.3.10-2 shows the number of sinkholes per municipality recorded in this inventory.

Table 4.3.10-2: Number of Sinkholes per Municipality in Centre County (DCNR, 2024)

MUNICIPALITY	NUMBER OF SINKHOLES
Benner Township	46
Centre Hall Borough	3
College Township	11
Ferguson Township	110

Table 4.3.10-2: Number of Sinkholes per Municipality in Centre County (DCNR, 2024)

MUNICIPALITY	NUMBER OF SINKHOLES
Gregg Township	48
Haines Township	19
Halfmoon Township	43
Harris Township	17
Marion Township	9
Miles Township	58
Millheim Borough	2
Patton Township	19
Penn Township	13
Potter Township	70
Spring Township	30
State College Borough	1
Walker Township	47
Total	**546**

Sinkholes are typically reported to municipal or county officials as necessary when they impact public infrastructure. Sinkholes occurring on private property are often not reported, especially when they do not affect any existing structures. In July 2015, a sinkhole opened in a suburban neighborhood in Ferguson Township (StateCollege.Com Staff, 2015). The sinkhole, which was approximately 20 feet wide, 20 feet long, and 15 feet deep, is shown in Figure 4.3.10-2. A sinkhole appeared on Penn State's campus in July 2015 as well on Bigler Road next to the Millennium Science Complex. As a result, the roadway was closed and all CATA buses were rerouted. This sinkhole, which is shown in Figure 4.3.10-3, was roughly 20 feet long, 15 feet wide, and 5 feet deep.



Figure 4.3.10-2: Sinkhole on Bigler Road on Penn State's campus (Murach, July 2015b)

Stakeholders in the 2015 planning process also identified additional occurrences of subsidence throughout Centre County including:

- On Purdue Mountain, a bank next to T-383 is subsiding.
- There are currently six known active sinkholes and over 50 outfalls in State College Borough.
- There are numerous sinkholes across Penn State University's campus.
- There are sinkholes, mostly on private property, in Marion Township.

In June 2018, a sinkhole was reported to the Centre County Office of Emergency Services. Heavy rain caused a sinkhole to open on SR-26 in College Township. In July 2018, a sinkhole opened on a residential street in Ferguson Township . The sinkhole was approximately 20 feet long, 20 feet wide, and 13 feet deep, and ruptured a water line. The Ferguson sinkhole remains the largest since 2015.

In December 2022 there was a sinkhole on Amblewood Way in Patton Township. On Christmas Day 18 homes in Park Forest Village were damaged or destroyed by the sinkhole. Some residents were displaced for months during repairs, and others who could not afford he repairs had to move (StateCollge.com,

2023).



Figure 4.3.10-3: Sinkhole Closes Road in Ferguson Township (Murach, July 2015a)



Figure 4.3.10-4: Workers repair sinkhole in Ferguson Township (Muthler & Hartley, 2018)



Figure 4.3.10-5: Christmas Day Sinkhole in Patton Township (Red Cross)

4.3.10.4 Future Occurrence

Based on geological conditions and the presence of previously formed sinkholes, subsidence events are likely to occur in the future for the areas of Centre County underlain by carbonate rock. Additionally, as noted in Section 4.3.4, Centre County anticipates an increase in the frequency and magnitude of flood events as a result of increasing amounts and intensity of precipitation. Increased rainfall has also been shown to increase occurrences of land subsidence and sinkholes. Therefore, the

recurrence of sinkholes is probable in the future, especially as climate change continues to increase the occurrence and severity of weather events. To counteract predicted weather intensity, repairs will need to be initiated, especially to protect nearby structures or other features. Most repairs include excavation of the sinkhole "throat", placement of durable materials (such as rip-rap) in the sinkhole void, and mitigation of the conditions that led to the formation of the sinkhole (such as stormwater discharges, broken pipes). Addressing these conditions can reduce future occurrences. Therefore, the future occurrence of subsidence can be considered *likely* as defined by the Risk Factor methodology probability criteria (see Table 4.4-1).

4.3.10.5 Vulnerability Assessment

Sinkholes can appear very suddenly and without warning and can continue to grow after the initial collapse making the surrounding ground unstable. Sinkholes on roadways are a danger to drivers, and those around gas lines can result in leaks or explosions if left undetected. Sinkholes cause structural damage and instability in homes, commercial buildings, roads, and bridges. As a natural characteristic of karst watersheds, the presence of high flow-rate springs (such as near Pleasant Gap, Spring Township) heighten the potential vulnerability to contamination from improper chemical or waste management.

The valley portions of the County are most vulnerable to the effects of natural subsidence events. Local roads may need annual repair and damage to gas lines, telephone, and electrical entry road facilities could occur in highly populated areas. Based on historical events, Ferguson, Potter, and Miles Townships are most vulnerable to sinkhole events. These municipalities have the highest occurrences of sinkholes. However, there are ten other municipalities in Centre County reporting ten or more sinkhole events, and a total of 17 communities have had reported sinkhole events (see Table 4.3.10-2).

The vulnerability of individual structures and critical facilities (excluding oil and gas wells) to subsidence and sinkhole events depends on underground site conditions related to the presence of limestone at each location. The number of structures and critical facilities vulnerable to subsidence and sinkhole areas has increased since 2021 because only data for limestone karst areas was available. For the 2025 plan, data for all karst areas was available and used for the spatial analysis. This differs from the 2020 plan where only data for limestone areas was available. Table 4.3.10-3 details the structures and critical facilities which are placed in subsidence areas distinguished by the presence of carbonate rock near land surface by municipality. The municipalities with the most structures vulnerable to subsidence are Ferguson Township (9,000), State College Borough (7,332), and Patton Township (6,425), while communities with the highest percentage of structures located on karst topography are State College Borough (100 percent), Bellefonte Borough (100 percent), Centre Hall Borough (100 percent), and

Howard Borough (100 percent). In Centre County, there are no conventional or unconventional oil or gas wells are located on karst topography. A majority of critical facilities are located on karst topography (347 out of 439). Dams and water and sewer treatment plants on karst topography may involve flood risk as a result of subsidence or sinkhole events.

Table 4.3.10-4 shows subsidence vulnerability by structure type. The most vulnerable land use types in Centre County are residential (56,872), agriculture (5,594), and Commercial (2,546). Mined Land (92), Communications (65), and vacant structures (71) were among the least vulnerable; this is likely as there are far fewer of these facilities than residential and commercial structures in the County.

Table 4.3.10-3: Structures and Critical Facilities Vulnerable to Subsidence, 2024

Municipality	Total Structures	Total Structures on Karst Topo-graphy	Percent Structures on Karst Topo-graphy	Total Critical Facilities	Critical Facilities on Karst Topo-graphy	Percent Critical Facilities on Karst Topo-graphy
Bellefonte Borough	3,608	3,608	100.0%	21	21	100%
Benner Township	4,185	3,565	85.2%	26	23	88%
Boggs Township	3,300	1,024	31.0%	8	6	75%
Burnside Township	753	30	4.0%	3		0%
Centre Hall Borough	1,006	1,006	100.0%	5	5	100%
College Township	6,214	6,178	99.4%	42	42	100%
Curtin Township	1,055	86	8.2%	2		0%
Ferguson Township	9,125	9,000	98.6%	34	34	100%
Gregg Township	3,131	1,933	61.7%	15	9	60%
Haines Township	2,580	1,581	61.3%	10	4	40%
Halfmoon Township	2,148	2,009	93.5%	9	9	100%
Harris Township	3,803	3,628	95.4%	11	9	82%
Howard Borough	587	587	100.0%	9	9	100%
Howard Township	1,141	627	55.0%	6	6	100%
Huston Township	1,594	484	30.4%	2	1	50%
Liberty Township	2,430	1,307	53.8%	6	5	83%
Marion Township	1,346	1,316	97.8%	5	3	60%
Miles Township	2,770	2,134	77.0%	13	9	69%
Milesburg Borough	859	676	78.7%	7	6	86%
Millheim Borough	840	812	96.7%	2	2	100%
Patton Township	6,567	6,425	97.8%	24	23	96%
Penn Township	1,786	1,303	73.0%	17	12	71%

Table 4.3.10-3: Structures and Critical Facilities Vulnerable to Subsidence, 2024

Municipality	Total Structures	Total Structures on Karst Topo-graphy	Percent Structures on Karst Topo-graphy	Total Critical Facilities	Critical Facilities on Karst Topo-graphy	Percent Critical Facilities on Karst Topo-graphy
Philipsburg Borough	1,811	-	0.0%	12	-	0%
Port Matilda Borough	458	346	75.5%	4	3	75%
Potter Township	4,648	2,780	59.8%	15	11	73%
Rush Township	4,587	867	18.9%	26	3	12%
Snow Shoe Borough	595	267	44.9%	3	1	33%
Snow Shoe Township	2,677	553	20.7%	6	1	17%
Spring Township	6,153	5,672	92.2%	30	28	93%
State College Borough	7,332	7,332	100.0%	42	42	100%
Taylor Township	1,281	141	11.0%	1	-	0%
Union Township	1,865	340	18.2%	7	5	71%
Unionville Borough	264	223	84.5%	1	1	100%
Walker Township	4,311	4,249	98.6%	12	12	100%
Worth Township	1,059	107	10.1%	3	2	67%
Total	**97,869**	**72,196**	**73.8%**	**439**	**347**	**79%**

Table 4.3.10-4: Structures Vulnerable to Subsidence by Municipality and Land Use Type in Centre County, 2024

MUNICIPALITY	TOTAL STRUCTURES	AGRICULTURE	COMMERCIAL	COMMUNICATIONS	FORESTS	INDUSTRIAL	MINED LAND	MIXED USE	PUBLIC OR SEMI-PUBLIC	RECLAIMED LAND	RECREATION	RESIDENTIAL	TRANSPORTATION	UTILITY	VACANT AND UNUSED LAND	VACANT STRUCTURE	WATER	TOTAL
Bellefonte Borough	3,608	1	99	3	7	25	-	198	84	-	14	3,132	12	5	16	11	1	3,608
Benner Township	4,185	307	135	2	69	33	12	13	173	-	5	2,578	45	28	165	-	-	3,565
Boggs Township	3,300	58	119	-	14	11	-	14	43	-	30	716	2	15	2	-	-	1,024
Burnside Township	753	-	-	-	1	-	4	-	-	-	-	24	-	1	-	-	-	30
Centre Hall Borough	1,006	2	34	1	2	4	-	51	90	-	3	814	2	-	1	2	-	1,006
College Township	6,214	229	345	5	59	126	3	4	329	-	89	4,732	36	50	161	10	-	6,178
Curtin Township	1,055	-	-	-	10	-	-	-	-	-	-	72	-	4	-	-	-	86
Ferguson Township	9,125	651	358	5	108	52	-	9	73	-	56	7,480	27	15	160	5	1	9,000
Gregg Township	3,131	436	59	1	57	8	-	68	56	-	6	1,216	4	1	19	2	-	1,933
Haines Township	2,580	426	20	1	19	8	8	27	26	-	13	1,024	-	1	7	1	-	1,581
Halfmoon Township	2,148	240	45	-	72	-	-	-	8	-	16	1,604	4	8	11	-	1	2,009
Harris Township	3,803	179	58	1	54	8	-	35	31	-	29	3,131	7	20	72	2	1	3,628
Howard Borough	587	-	5	1	3	1	-	12	13	-	15	532	-	3	-	2	-	587

Table 4.3.10-4: Structures Vulnerable to Subsidence by Municipality and Land Use Type in Centre County, 2024

MUNICIPALITY	TOTAL STRUCTURES	AGRICULTURE	COMMERCIAL	COMMUNICATIONS	FORESTS	INDUSTRIAL	MINED LAND	MIXED USE	PUBLIC OR SEMI-PUBLIC	RECLAIMED LAND	RECREATION	RESIDENTIAL	TRANSPORTATION	UTILITY	VACANT AND UNUSED LAND	VACANT STRUCTURE	WATER	TOTAL
Howard Township	1,141	10	31	-	15	-	-	15	20	-	59	462	-	5	1	-	9	627
Huston Township	1,594	29	53	1	4	-	-	6	8	-	14	358	5	2	4	-	-	484
Liberty Township	2,430	66	19	1	22	-	-	17	14	-	156	1,000	1	9	-	1	1	1,307
Marion Township	1,346	278	37	4	43	16	17	7	14	-	44	845	-	1	10	-	-	1,316
Miles Township	2,770	673	118	-	22	25	-	32	31	-	22	1,201	-	-	10	-	-	2,134
Milesburg Borough	859	-	22	-	4	-	-	23	88	-	9	521	3	4	-	2	-	676
Millheim Borough	840	35	29	1	8	6	-	43	12	-	9	646	1	2	15	5	-	812
Patton Township	6,567	125	157	5	93	36	-	10	60	-	28	5,691	15	6	199	-	-	6,425
Penn Township	1,786	305	45	-	16	-	-	18	15	-	13	874	-	7	10	-	-	1,303
Philipsburg Borough	1,811	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Port Matilda Borough	458	2	6	2	2	2	-	1	9	-	9	308	-	1	3	1	-	346
Potter Township	4,648	644	114	2	53	14	4	45	34	-	16	1,813	2	10	27	2	-	2,780
Rush Township	4,587	7	13	12	45	1	-	11	20	-	104	633	4	10	7	-	-	867

Table 4.3.10-4: Structures Vulnerable to Subsidence by Municipality and Land Use Type in Centre County, 2024

MUNICIPALITY	TOTAL STRUCTURES	AGRICULTURE	COMMERCIAL	COMMUNICATIONS	FORESTS	INDUSTRIAL	MINED LAND	MIXED USE	PUBLIC OR SEMI-PUBLIC	RECLAIMED LAND	RECREATION	RESIDENTIAL	TRANSPORTATION	UTILITY	VACANT AND UNUSED LAND	VACANT STRUCTURE	WATER	TOTAL
Snow Shoe Borough	595	-	12	1	1	-	-	3	6	-	23	218	-	-	2	1	-	267
Snow Shoe Township	2,677	-	33	2	33	1	4	2	16	-	1	448	3	1	8	-	1	553
Spring Township	6,153	280	170	7	69	64	40	83	80		37	4,648	6	39	140	9		5,672
State College Borough	7,332	-	261	2	19	3	-	324	347	-	64	6,190	76	25	7	13	1	7,332
Taylor Township	1,281	22	6	-	4	-	-	2	1	-	-	90	-	9	6	-	-	141
Union Township	1,865	39	30	-	10	-	-	1	3	-	4	241	-	5	6	1	-	340
Unionville Borough	264	6	1	-	1	-	-	4	11	-	2	194	3	-	-	1	-	223
Walker Township	4,311	538	88	5	86	10	-	31	25	-	33	3,388	-	15	29	-	1	4,249
Worth Township	1,059	6	24	-	7	-	-	4	5	-	1	48	1	7	4	-	-	107
Total	**97,869**	**5,594**	**2,546**	**65**	**1,032**	**454**	**92**	**1,113**	**1,745**	**-**	**924**	**56,872**	**259**	**309**	**1,102**	**71**	**17**	**72,196**

4.3.10.6 Equity in Vulnerable Communities

In terms of equitable hazard mitigation planning, communities that are at risk are often found in rural areas. Land previously used for agriculture, mining, or extraction of water can increase the risk of subsidence and sinkholes due to over-extraction. Simultaneously, rural communities may also lack the resources to prevent or respond to such events. Low-income communities often live in older, poorly constructed homes or areas where housing is cheaper but more vulnerable to geological hazards like subsidence and sinkholes making them also slightly more at risk.

4.3.11 Tornado, Windstorm

4.3.11.1 Location and Extent



Tornadoes and potentially damaging high winds occur throughout Pennsylvania. Tornados and high winds can be experienced at any location in Centre County.

A tornado, a violently rotating funnel-like vortex, is an extraordinary feature of severe thunderstorms. A condensation funnel does not need to reach to the ground for a tornado to be present; a debris cloud beneath a thunderstorm is all that is needed to confirm the presence of a tornado, even in the total absence of a funnel. While the extent of tornado damage is usually localized, the extreme winds of this vortex can be among the most destructive on earth when they move through populated, developed areas.

Tornadoes can occur at any time during the day or night but are most frequent during late afternoon into early evening, the warmest hours of the day. May to August is the most likely time for tornados to occur in Pennsylvania. Tornado movement is characterized in two ways: direction and speed of spinning winds and forward movement of the tornado, also known as the storm track. Rotational wind speeds of the vortex can range from 100 mph to more than 250 mph. In addition, the speed of forward motion can be zero to 45 or 50 mph. Therefore, some estimates place the maximum velocity (combination of ground speed, wind speed, and upper winds) of tornadoes at about 300 mph.

The forward motion of the tornado path can be a few hundred yards or several hundred miles in length. The width of tornadoes can vary greatly, but generally ranges from less than 100 feet to over a mile in width. Some tornadoes never touch the ground and are short-lived, while others may touch the ground several times.

Straight-line winds often accompany tornados and are caused by the movement of air from areas of higher pressure to areas of lower pressure – the greater the difference in pressure, the stronger the winds. Windstorms are generally defined as sustained wind speeds of 40 mph or greater lasting for one hour or longer, or winds of 58 mph or greater for any duration.

4.3.11.2 Range of Magnitude

The destruction caused by tornadoes ranges from light to inconceivable depending on the intensity, size, and duration of the storm. Typically, tornadoes cause the greatest damages to structures of light construction, such as mobile homes. The impact of tornado hazards is ultimately dependent on the population or amount of property present in the area in which the tornado occurs. Tornado events are often so severe that property loss or human fatality is typically inevitable if evacuation or proper construction standards are not implemented.

Since 2007, the Enhanced Fujita Scale (or the −EF-Scale) has been used in the United States to describe the magnitude of tornadoes. Prior to 2007, the Fujita Scale (F-Scale) was commonly used to describe magnitude. The EF scale is based on new information about the relationship between wind speed given in miles per hour (mph) and corresponding damages. It categorizes tornadoes from EF0 to EF5, with EF0 being the lowest magnitude yet most commonly occurring type of tornado. The strongest tornado recorded in Centre County was a category F4. Table 4.3.11-1 shows the relationship between the EF- and F- Scales. The types of damages that can be expected with each category of tornado are described in Table 4.3.11-2.

Table 4.3.11-1: Enhanced Fujita Scale (EF-Scale) categories with associated wind speeds

FUJITA SCALE		ENHANCE FUJITA SCALE	
F NUMBER	3-SECOND GUST (MPH)	EF NUMBER	3-SECOND GUST (MPH)
0	45-78	0	65-85
1	79-117	1	86-110
2	118-161	2	111-135
3	162-209	3	136-165
4	210-261	4	166-200
5	262-317	5	Over 200

Table 4.3.11-2: Expected Tornado Damages

F OR EF SCALE	EXAMPLES OF POSSIBLE DAMAGE
0	Light damage. Some damage to chimneys; broken tree branches; shallow-rooted trees pushed over; damage to sign boards.

Table 4.3.11-2: Expected Tornado Damages

F OR EF SCALE	EXAMPLES OF POSSIBLE DAMAGE
1	Moderate damage. Roof surface peeled off; mobile homes pushed off foundations or overturned; moving automobiles pushed off roads.
2	Considerable damage. Roofs torn off frame houses; mobile homes demolished; boxcars pushed over; large trees snapped or uprooted; light-object missiles generated.
3	Severe damage. Roofs and some walls torn off well-constructed houses; trains overturned; most trees in forest uprooted; cars lifted off ground and thrown.
4	Devastating damage. Well-constructed houses leveled; structures with weak foundations blown off some distance; cars thrown, and large missiles generated.
5	Catastrophic damage. Well-built houses swept away completely, leaving only the slab foundations.

Figure 4.3.5-1 shows wind speed zones developed by the American Society of Civil Engineers based on information including 40 years of tornado history and over 100 years of hurricane history. It identifies wind speeds that could occur across the United States to be used as the basis for design and evaluation of the structural integrity of shelters and critical facilities. Centre County falls in Zone III, meaning the whole County is susceptible to winds up to 200 miles per hour. The hurricane susceptibility shown in the map is discussed in Section 4.3.5. Shelters and critical facilities should be able to withstand a three second gust of up to 200 mph, regardless of whether the gust is the result of a tornado, hurricane, tropical storm, or windstorm event. In Centre County, all new residential and commercial structures are required to be constructed per the International Building Code (IBC), which requires structures to be designed to a 90-mph wind speed.

Since tornado and windstorm events are typically localized, environmental impacts are rarely widespread. However, where these events occur, severe damage to buildings and plant species is likely. This includes loss of trees and an increased threat of wildfire in areas where dead trees are not removed. Hazardous material facilities should meet design requirements to withstand a three-second gust of up to 160 mph in order to prevent release of hazardous materials into the environment.

The potential impacts of a tornado or windstorm on community lifelines are as follows:

Table 4.3.11-3: Most likely lifelines impacted by Tornadoes or Windstorms

LIFELINES	NOTES
	Government officials, including police and fire, will be needed for community safety due to potential harm from tornadoes, high winds, and associated weather conditions.
	Tornadoes and windstorms cause significant damage to agricultural operations and structures.
	Energy lifelines in response to recovery due to potential direct damage from tornadoes and windstorms.
	Material storage facilities and operations may be damaged due to significant damage from tornadoes and windstorms.

4.3.11.3 Past Occurrence

One of the deadliest tornadoes in Pennsylvania occurred during a tornado outbreak on May 31, 1985 when up to 43 tornados touched down in Pennsylvania, Ohio, New York, and southeastern Ontario. One storm, rated at EF5 (F4) intensity, tracked across the state forests of central Pennsylvania during the early evening producing tornadic winds of 200-250 mph. The tornado started four miles west-southwest of Penfield in northwest Clearfield County, it moved into Clinton County and eventually passed over the extreme northern tip of Centre County, in Burnside Township, before reentering Clinton County and finally ending seven miles northeast of downtown Lock Haven (just north of the Centre County border). Officials estimated that 85,000 to 90,000 trees were leveled across this track.

The worst-case scenario for tornado events in Centre County could be exemplified by this tornado outbreak in 1985. In this case, the EF5 (F4) tornado occurred mostly in adjacent counties. Little to no damages were reported in Centre County. However, had the path been different, the following damage could be anticipated for Centre County as well. In total, this event destroyed 13 houses, a large steel fire tower, and many miles of state forest. Major population centers were missed, sparing many lives. The tornado was estimated to remain on the ground more than one hour and 25 minutes and covered a path of about 70 miles.

The HMSC recognizes that this type of tornado is extremely rare and that this event would represent a worst-case scenario only. More typical wind hazard events in Centre County involve tree and limb damage, with barn roof damage typically sustained as these represent some of the oldest and most susceptible structures.

A list of tornado events that have occurred in Centre County between 1950 and 2020 is shown in Table 4.3.11-4 with an associated F-Scale magnitude. Figure 4.3.11-1 also shows the approximate location of previous events from 1975 to 2023 that had center of circulation located in or tracked through Centre County

In April 2015, the County experienced a tornado due to a violent series of storms that passed through the State College area. Officials from NWS confirmed that a tornado touched down near Colyer Lake, passing through areas of Church Road in Potter Township and then traveling northeast. The tornado was reported to have had maximum winds of 65 mph and width of 40 yards wide and remained on the ground for about one mile. Residents impacted by the tornado experienced minimal property damage from the event (Bauer, 2015).

On May 1, 2017, a strong storm with high winds and possibly multiple tornados impacted Centre County. NWS determines at least one tornado touched down in Rebersburg. The storm knocked out power for over tens of thousands of County residents. Residents noted unusual strong winds that lasted for almost 10 to 15 minutes, which is much longer than is typically seen. This resulted in many trees being downed, as they were constantly being hit by the storm. The storm also came with flash flood events that caused road closures and downed power lines on roadways. One man was injured when the storm collapsed his garage while he was inside (Yoder, 2017).

Table 4.3.11-4: Previous Tornado Events in Centre County (NOAA NCEI, 2020a, Rushton, 2023)

LOCATION	DATE	ESTIMATED LENGTH	ESTIMATED WIDTH	MAGNITUDE (F-SCALE)	ESTIMATED PROPERTY DAMAGE ($)
Countywide	6/5/1975	Not provided	Not provided	F2	250,000
Countywide	6/5/1975	Not provided	Not provided	F1	2,500
Countywide	7/29/1976	0.3 mile	40 yards	F1	250,000
Burnside	5/31/1985	4.5 miles	3330 yards	F4	25,000,000*
Countywide	2/16/1990	3.0 miles	350 yards	F1	250,000
Countywide	4/9/1991	0.5 miles	60 yards	F0	25,000
Spring Mills	11/8/1996	4.0 miles	550 yards	F0	100,000
Bellefonte	5/29/1998	2.0 miles	440 yards	F0	0

Table 4.3.11-4: Previous Tornado Events in Centre County (NOAA NCEI, 2020a, Rushton, 2023)

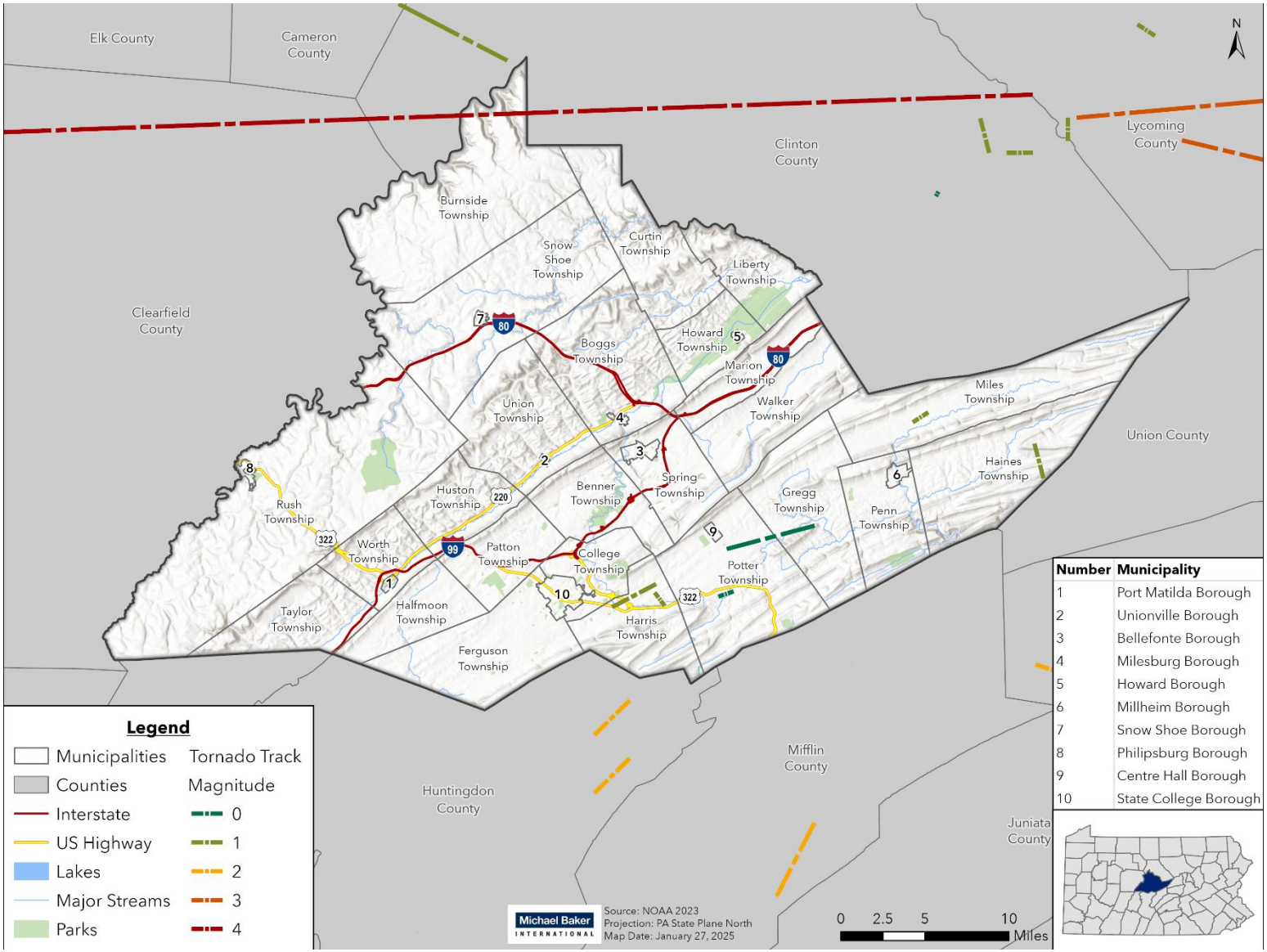
LOCATION	DATE	ESTIMATED LENGTH	ESTIMATED WIDTH	MAGNITUDE (F-SCALE)	ESTIMATED PROPERTY DAMAGE ($)
Philipsburg	6/2/1998	0.5 mile	67 yards	F0	0
Woodward	8/7/2007	2.0 miles	400 yards	EF1	0
Linden Hall	6/27/2013	1 mile	75 yards	EF1	0
Tusseyville	4/20/2015	0.96 miles	40 yards	EF0	5,000
Smullton	5/1/2017	1.1 miles	100 yards	EF1	200,000
Zion	7/2/2023	0.6 mile	200 yards	EF1	0

* Reflects total damage from tornado track, only a small portion of which was in Centre County



Figure 4.3.11-2: Trees after a wind event in Huston Township, August 2024

Figure 4.3.11-3: Tornado History in Centre County, 1950-2023



4.3.11.4 Future Occurrence

For the period between 1950 and 2024, 14 tornadoes were reported in Centre County by NCEI. Therefore, the annual probability of being in the path of a tornado in Centre County is relatively minor. While the chance of being hit by a tornado is small, the damage that results when the tornado arrives can be potentially devastating. An F4 tornado, with a 0.01-percent-annual probability of occurring, can carry wind velocities of 200 mph, resulting in a force of more than 100 pounds per square foot of surface area. This is a "wind load" that exceeds the design limits of most buildings. While most of the recent windstorms and tornadoes have occurred outside of the county, their proximity contributes to future risk. Because more windstorms have been seen in the central Pennsylvania region, it is possible that an increasing number of tornadoes will be seen in Centre County.

Climate models project atmospheric conditions conducive to severe thunderstorms, tornadoes, and hail and wind will become more likely, but those events may not actually become more frequent themselves (Kossin et al. 2017). Projecting tornado activity based on more conducive conditions is difficult, as less than 10% of severe thunderstorms even produce tornadoes (Treisman, 2021). Therefore, the impact of climate change on this hazard's occurrence and intensity is unknown.

According to NCEI, there have been over 245 wind events in Centre County between 1950 and 2024. Centre County experiences windstorm events more commonly than tornadoes, which causes power failures, loss of communication networks, and residents requiring temporary shelters and provision of supplies. The probability of tornadoes and windstorms in Centre County can be considered *possible* as defined by the Risk Factor Methodology probability criteria (see Table 4.4.1-1).

4.3.11.5 Vulnerability Assessment

For tornadoes or high winds, aged and dilapidated structures or structures not built to applicable building codes are more susceptible to damage. Mobile homes and campgrounds are especially susceptible to damage due to tornado or high wind. Strong winds can rip roofs off of any dilapidated structures and overturn mobile homes. Past experiences with tornadoes in Centre County shows that death and injury are indeed possibilities. Vulnerability to the effects of a tornado or high wind is somewhat dependent upon the age of a structure because as building codes become more stringent, buildings are capable of enduring greater wind forces.

In Centre County, high winds occur annually. The most common detrimental effects are interruptions in power supply and communications services due to downed wires and blocked roadways due to downed trees. Most severe power failures or outages are

regional events. With the loss of power, electrical-powered equipment and systems will not be operational. Examples include lighting, HVAC and ancillary support equipment, communication systems, ventilation system, refrigerators, sterilizers, and medical equipment. This can cause food spoilage, loss of heat or air conditions, basement flooding (sump pump failure), lack of light, loss of water (well pump failure), lack of phone service, or lack of internet. While it is most often a short-term nuisance rather than a catastrophic hazard, utility interruptions can cause challenges for communications and response, particularly in more rural areas of the county. A worst-case scenario for utility interruption in Centre County would involve a power outage during winter snow or ice storms, which have the potential to cause power outages for prolonged periods of time.

High winds often occur during hurricanes, tropical storms, and nor'easters. Information about potential annualized losses due to hurricane winds can be found in Section 4.3.5.

All structures and infrastructure might be exposed to the effects of a tornado or other high winds. Depending upon the severity of a tornado or high wind, any existing structures might be damaged to some extent. Any future structures might be exposed to tornados or high winds as this hazard does not occur in specific locations. However, future buildings will be somewhat protected from the effects of tornado or high wind as they will meet the most current State building code requirements for bracing and roof design.

Manufactured housing (i.e. mobiles homes or trailers) is particularly vulnerable to high winds and tornadoes. The U.S. Census Bureau defines manufactured homes as "movable dwellings, eight feet or wider and 40 feet or longer, design to be towed on its own chassis, with transportation gear integral to the unit when it leaves the factory, and without need of a permanent foundation (U.S. Census Bureau, 2020)." They can include multi-wide and expandable manufactured homes but exclude travel trailers, motor homes, and modular housing. Due to their lightweight and often unanchored design, manufactured housing is extremely vulnerable to high winds and will generally sustain the most damage.

As of 2018, there are an estimated total of 4,016 mobile home structures in Centre County. Table 4.3.11-5 details the total residential structures and the number of mobile home structures in each municipality. Benner Township, Potter Township, and Liberty Township have the most mobile homes, 492, 381, and 366 respectively. Liberty and Union Townships have the highest percentages of residential structures that are mobile homes (19.4 percent and 16.7 percent, respectively). College Township, Harris Township, and Howard Borough are the only municipalities in the County that have no

mobile homes. Zoning restrictions within these municipalities are most likely the cause of this difference. Higher concentrations of mobile home structures increase the vulnerability of the area to tornadoes and windstorms.

Table 4.3.11-5: Mobile homes in Centre County (U.S. Census Bureau, 2018)

MUNICIPALITY	TOTAL RESIDENTIAL STRUCTURES	TOTAL MOBILE HOMES	PERCENT MOBILE HOMES
Bellefonte Borough	3,132	2	0.1%
Benner Township	3,086	492	15.9%
Boggs Township	2,491	365	14.7%
Burnside Township	617	35	5.7%
Centre Hall Borough	814	6	0.7%
College Township	4,765	-	0.0%
Curtin Township	805	74	9.2%
Ferguson Township	7,559	129	1.7%
Gregg Township	2,099	141	6.7%
Haines Township	1,583	74	4.7%
Halfmoon Township	1,706	18	1.1%
Harris Township	3,231	-	0.0%
Howard Borough	532	-	0.0%
Howard Township	880	88	10.0%
Huston Township	1,215	151	12.4%
Liberty Township	1,886	366	19.4%
Marion Township	862	40	4.6%
Miles Township.	1,632	102	6.3%
Milesburg Borough	698	76	10.9%
Millheim Borough	672	27	4.0%
Patton Township	5,781	9	0.2%
Penn Township	1,230	109	8.9%
Philipsburg Borough	1,526	77	5.0%
Port Matilda Borough	394	26	6.6%
Potter Township	3,123	381	12.2%
Rush Township	3,756	298	7.9%
Snow Shoe Borough	517	31	6.0%
Snow Shoe Township	2,190	170	7.8%
Spring Township	5,018	75	1.5%
State College Borough	6,190	29	0.5%
Taylor Township	921	112	12.2%

Table 4.3.11-5: Mobile homes in Centre County (U.S. Census Bureau, 2018)

MUNICIPALITY	TOTAL RESIDENTIAL STRUCTURES	TOTAL MOBILE HOMES	PERCENT MOBILE HOMES
Union Township	1,385	231	16.7%
Unionville Borough	234	17	7.3%
Walker Township	3,429	204	5.9%
Worth Township	772	61	7.9%
Total	**76,731**	**4,016**	**5.2%**

Overall, however, tornado and windstorm events are not specific to select parts of the County. Rather, a tornado could strike in any part of the County at any time and could cause as much or as little damage as possible for the given magnitude event. Historically, however, Centre County has been most typically impacted by minimal (EF0-EF2) tornadoes, with no event resulting in significant monetary damages.

Environmental impacts from tornadoes can include debris in streams, wetlands, and other sensitive environmental features. Tree damage is commonly seen after high wind events. Hazardous material facilities should meet design requirements for the wind zones identified in Figure 4.3.5-1 in order to prevent release of hazardous materials into the environment.

4.3.11.6 Equity in Vulnerable Communities

Regarding equity, there are several communities of consideration when it comes to planning for tornadoes and windstorms. Manufactured home communities, primarily mobile homes, are extremely at risk in the face of tornadoes as they are highly susceptible to high-speed winds. This means areas of Union Township, Unionville Borough, Benner Township, Potter Township, Miles Township, Rush Township, and Philipsburg Borough may be particularly vulnerable. Additionally, households without vehicles, smartphones, or people with disabilities are also at higher risk if evacuation becomes necessary as all of these factors present significant barriers to active response times. As previously mentioned, this includes most municipalities as many have relatively high concentrations of at least one of those population groups.

4.3.12 Wildfire

4.3.12.1 Location and Extent



A wildfire is an uncontrolled fire spreading through vegetative fuels, exposing and possibly consuming structures. A wildland fire is a wildfire in an area in which development is essentially nonexistent, except for roads, railroads, power lines, and similar facilities. An urban-wildland interface fire is a wildfire in a geographical area where structures and other human development meet or intermingle with wildland or vegetative fuels.

The most high-risk areas of the County are at the forest-urban interface, where the potential for wildfire to spread to structures is greatest.

Wildfires can occur at any time of the year but are most likely to occur in the County during a drought. Wildland fires in Pennsylvania can occur in fields, grass, and brush as well as in the forest itself. Under dry conditions or drought, wildfires have the potential to burn forests as well as croplands. Any small fire in a wooded area, if not quickly detected and suppressed, can get out of control. Most wildland fires are caused by human carelessness, negligence, and ignorance. In 2017, debris burning accounted for the largest number of wildfires, while incendiary causes accounted for the largest number of acres burned in Pennsylvania (DCNR, 2017). However, some are precipitated by lightning strikes and in rare instances, spontaneous combustion.

Portions of the Bald Eagle (eastern County border), Moshannon (east of the Borough of Philipsburg and south of I-80), Rothrock (southern County border), and Sproul (northern County border) State Forests are located in Centre County. These forests, as well as several State Gameland areas, are of particular concern for wildfire events due to the large area of expanded woodland. However, a wildfire could develop in any portion of the County.

4.3.12.2 Range of Magnitude

Wildfire events can range from small fires that can be managed by local firefighters to large fires impacting many acres of land. Large events may require evacuation from one or more communities and necessitate regional or national firefighting support. The impact of a severe wildfire can be devastating. A wildfire has the potential to kill people, livestock, fish, and wildlife. They often destroy property, valuable timber, and forage, recreational, and scenic values.

Vegetation loss is an environmental concern with wildfires, but it typically is not a serious impact in that they burn dead trees, leaves, and grasses to allow more open space for new and different types of vegetation to grow and receive sunlight. Another positive effect of a wildfire is that it stimulates the growth of new shoots on trees and shrubs and its heat can open pinecones and other seed pods. The most significant negative impact is the potential for severe erosion, silting of stream beds and reservoirs, and flooding due to ground-cover loss following a fire event. Approximately 75 percent of Centre County consists of forested areas, in many cases surrounded by cropland and pastures (CCPCDO, 2014). 99 percent of wildfires in Pennsylvania are caused by people, often by debris burns (DCNR-BOF, 2015).

In addition to the risk wildfires pose to the general public and property owners, the safety of firefighters is also a concern. Although loss of life among firefighters does not occur often in Pennsylvania, it is always a risk. More common firefighting injuries include falls, sprains, abrasions, or heat-related injuries such as dehydration. Response to wildfires also exposes emergency responders to the risk of motor vehicle accidents and can place them in remote acres away from the communities that they are chartered to protect.

One of the more significant wildfire events in recent history occurred in May of 2006 (Bosak, 2006). Known as the Treaster Kettle Fire, this incident occurred in Harris Township. Fire companies from all of Centre County as well as companies from Huntingdon, Blair, Mifflin, and Lycoming Counties fought this blaze. DCNR Bureau of Forestry (DCNR-BOF) provided a helicopter, airplane, and multiple dozers to combat the fire. The fire was believed to have been started by a downed power line, and it spread quickly due to low relative humidity and dry leaf cover. The fire burned over 400 acres and was responsible for $86,000 in damages. More recently, a wildfire broke out in Rush Township in November of 2022 after a prescribed burn the day prior. Though the fire spanned 700-800 acres total, no injuries, deaths, or structural damage was reported. In April of 2023, a wildfire broke out in the northern part of Centre County. Two air tankers and a helicopter were deployed to put out the fire, which had spread to 1,200 acres by the following day. This fire was caused by unseasonably warm and dry weather (NOAA NCEI, 2024). The worst-case scenario for a wildfire in Centre County would be a similar uncontrolled fire that spreads from forested areas into bordering residential areas, causing significant damage to homes and other assets in addition to natural resources. See Table 4.3.12-4 for details on structures and critical facilities in high hazard and forested areas.

The potential impacts of wildfire n community lifelines are as follows:

Table 4.3.12-1: Most Likely Lifelines Impacted by Wildfire

LIFELINES	NOTES
	Fire departments will need to respond and possibly recover where community safety is threatened.
	Shelter lifeline as wildlife directly threatens homes and potentially agricultural operations.
	Potential serious injuries and fatalities may occur.

4.3.12.3 Past Occurrence

Centre County OES provided reports from 2021 through 2024, which detail calls received regarding wildfires. According to the log, 79 wildfires occurred between 2021 and August of 2024. Wildfires during this period were catalyzed by various factors, including fallen power lines, uncontrollable prescribed burns, brush ignition, and roadway fires. Figure 4.3.12-1 displays the location of past wildfire events in Centre County from 2000 to 2024. As shown in the map, wildfires generally occur throughout all of Centre County, although there is a cluster of events in Rush Township and Philipsburg.

In April 2018, three wildfire events were reported. Two of these occurred in Boggs Township, and each covered around 20-30 acres. Air tankers were deployed to suppress these fires. Later in the month, there was a large wildfire event between 700 and 800 acres in Rush Township, which is described in detail below. In March 2019, a wildfire was set adjacent to development in Marion Township. In August 2020, there were 11 wildland fires throughout the county between the 22nd and 23rd. These were caused by drought conditions.

On April 24, 2018, Centre County experienced a wildfire reaching over 700 acres across Rush Township (Rushton, 2018). The fire was set as a prescribed burn by the Pennsylvania Department of Conservation and Natural Resources in Sproul State Forest. However, high winds blew embers about a half-mile outside of the operation area. DCNR quickly employed a contingency plan, but suppression activities were hampered by high winds, heavy natural fuels, and difficult terrain. This incident shows the need for emergency response even during planned events.

Table 4.3.12-2: EMS Logged Wildfire Events 2021 through 2024

DATE	MUNICIPALITY	EVENT	DESCRIPTION
4/28/2021	Benner Township	Wildland Fire	Remote wildland fire caused by power line
6/6/2022	Benner Township	Wildfire	Two acres burned near youth detention center
9/27/2022	Gregg Township	Wildfire	Wildfire near barn
11/10/2022	Rush Township	Wildfire	700-800 acres burned caused by a prescribed burn on 11/8/2022
1/28/2023	Walker Township	Wildfire	Fire along roadway
2/04/2023	Haines Township	Wildfire	Brush caught on fire
2/10/2023	Potter Township	Wildfire	Brush fire in field
2/11/2023	Potter Township	Wildfire	Brush fire in field
2/13/2023	Miles Township	Wildfire	Field caught on fire
2/14/2023	Potter Township	Wildfire	Brush pile caught on fire
2/15/2023	Penn Township	Wildfire	Small brush fire caused by fallen power line
2/19/2023	Union Township, Walker Township	Wildfire	50' X 50' fire in the field 100' X100' fire moving up the hill
2/26/2023	Potter Township	Wildfire	Field between Egg Hill & Lucas Lane on fire
3/2/2023	Marion Township	Wildfire	Tree line on fire
3/6/2023	Marion Township	Wildfire	Fire along 1-80 westbound
3/7/2023	Huston Township	Wildfire	Field fire
3/9/2023	Boggs Township	Wildfire	Fire long 1-80 eastbound
3/16/2023	Harris Township, Spring Township	Wildfire	Fire near the West Penn Substation. Small grass fire in the median
3/22/2023	Burnside Township	Wildfire	Fire in a field
4/1/2023	Miles Township	Wildfire	Small fire along the road
4/2/2023	Boggs Township, Snow Shoe Township	Wildfire	Unknown conditions
4/5/2023	Burnside Township	Wildfire	Fire along the roadway
4/8/2023	Burnside Township	Wildfire	Fire along the roadway

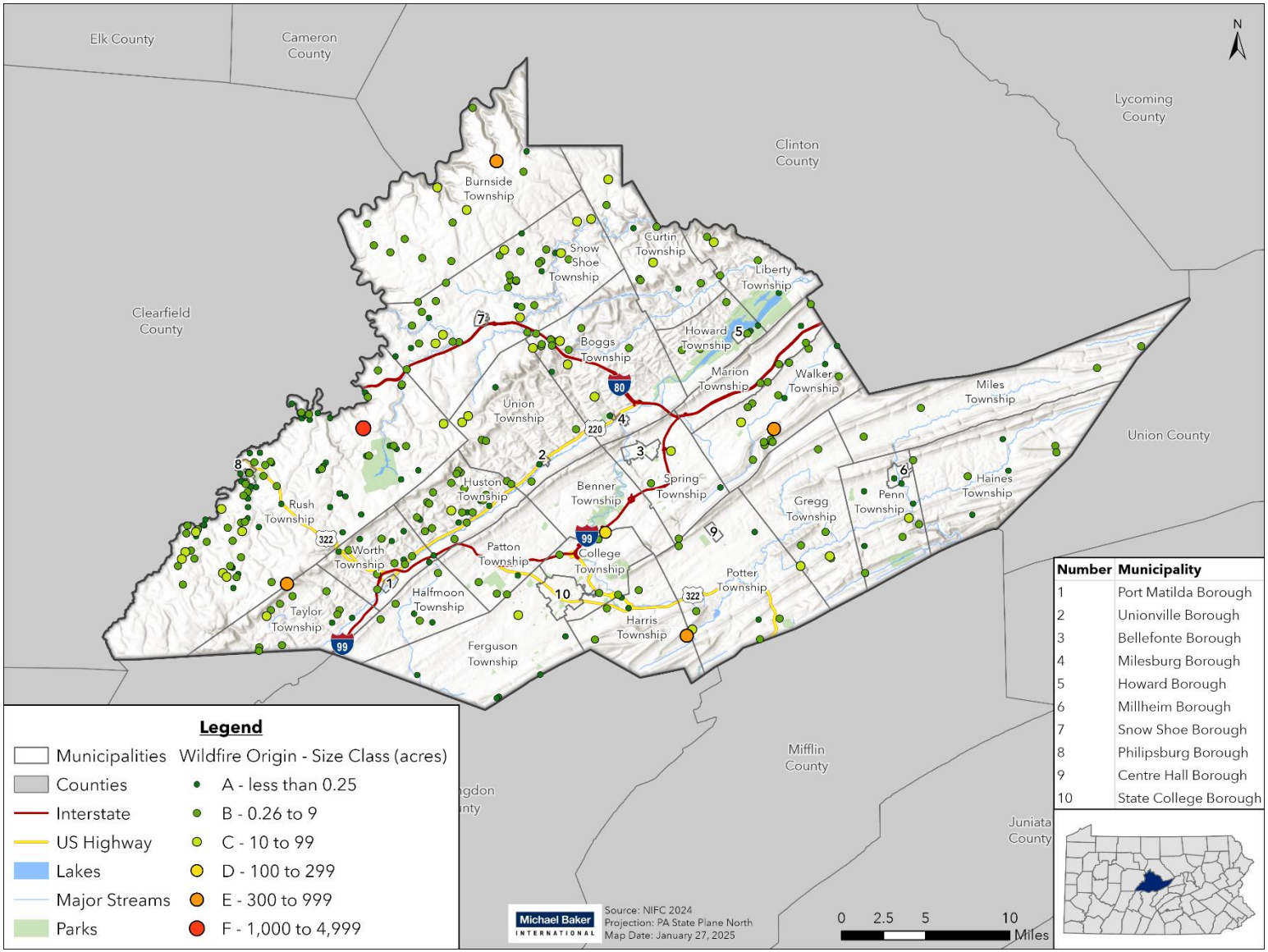
Table 4.3.12-2: EMS Logged Wildfire Events 2021 through 2024

DATE	MUNICIPALITY	EVENT	DESCRIPTION
4/9/2023	Boggs Township, Snow Shoe Township	Wildfire	Unknown conditions
4/11/2023	Miles Township	Wildfire	Unknown conditions
4/12/2023	Harris Township	Wildfire	Unknown conditions
4/13/2023	Ferguson Township, Potter Township, Worth Township	Wildfire	Fire along the roadway
4/14/2023	Gregg Township, Miles Township, Taylor Township	Wildfire	Fire in the field
4/15/2023	Potter Township	Wildfire	Multiple area field fire
4/20/2023	Liberty Township, Rush Township	Wildfire	1,445 acres burned in this multiple day wildfire
4/27/2023	Gregg Township	Wildfire	Fire in the area
5/9/2023	College Township	Wildfire	Fire along the roadway near ramp
5/11/2023	Halfmoon Township, Snow Shoe Township	Wildfire	Fire along the roadway
5/14/2023	Snow Shoe Township	Wildfire	Fire along the roadway
5/21/2023	Snow Shoe Township	Wildfire	Fire along the roadway
5/22/2023	Miles Township	Wildfire	Fire in the area of the reservoir
5/23/2023	Potter Township	Wildfire	Fire in the area
5/25/2023	Rush Township	Wildfire	Fire along the road
5/27/2023	Miles Township	Wildfire	Field fire
5/28/2023	Spring Township	Wildfire	Fire in the area
5/30/2023	Boggs Township	Wildfire	Fire along the road
6/1/2023	Ferguson Township	Wildfire	Unknown conditions
6/4/2023	Curtin Township	Wildfire	Field fire
6/5/2023	Harris Township	Wildfire	Fire in the area
6/11/2023	Boggs Township	Wildfire	Fire in the area
6/30/2023	Marion Township	Wildfire	Wildfire along the roadway
7/8/2023	Miles Township	Wildfire	Fire in the woods to the rear of property

Table 4.3.12-2: EMS Logged Wildfire Events 2021 through 2024

DATE	MUNICIPALITY	EVENT	DESCRIPTION
8/3/2023	Liberty Township	Wildfire	Fire in the area
8/25/2023	Benner Township	Wildfire	Controlled burn now out of control
9/28/2023	Boggs Township	Wildfire	Fire caused by a down electric line
10/25/2023	Boggs Township	Wildfire	Fire behind Robinson's
11/5/2023	Walker Township	Wildfire	Leaves on fire in the yard
11/7/2023	Harris Township	Wildfire	Fire in the area
11/11/2023	Potter Township	Wildfire	Corn field on fire
11/14/2023	Potter Township, Rush Township	Wildfire	Fire in the area
11/16/2023	Huston Township, Walker Township	Wildfire	Controlled fire not out of control, small fire along the road
11/17/2023	Gregg Township	Wildfire	Small fire behind the storage shed
11/24/2023	Penn Township	Wildfire	Small brush fire in the corn field
12/22/2023	Worth Township	Wildfire	Brush fire in the area
2/5/2024	Potter Township	Wildfire	Fire in the area
2/7/2024	Spring Township	Wildfire	Mulch fire
2/9/2024	Ferguson Township	Wildfire	30" X 40" area on fire
2/20/2024	Liberty Township	Wildfire	Fire in the area
2/25/2024	Haines Township	Wildfire	N/A
3/20/2024	Ferguson Township	Wildfire	Fire in the woods spreading toward Staples

Figure 4.3.12-1: Wildfire History in Centre County, 2000-2024



4.3.12.4 Future Occurrence

Previous events indicate that annual wildfire occurrences in the County are expected. Weather conditions like drought can increase the likelihood of wildfires occurring. Many wildfires in the county are also the result of human-caused ignitions. Any fire, without the quick response or attention of fire-fighters, forestry personnel, or visitors to the forest, has the potential to become a wildfire. Therefore, the probability of an urban fire or wildfire occurring in Centre County is considered *possible* as defined by the Risk Factor Methodology probability criteria (see Table 4.4-1).

The Climate Mapping for Resilience and Adaptation (CRMA) Tool provides a county-level assessment report for wildfire, shown in Figure 4.3.12-11 below. The future climate indicators for wildfire are precipitation and temperatures thresholds. According to CRMA, the days per year with no precipitation is projected to increase slightly while the days with maximum temperatures above 90 degrees Fahrenheit are expected to increase significantly. These projections show that the conditions in the future may make wildfires more likely.

Figure 4.3.12-2: Centre County Wildfire Hazard Assessment Report (CRMA, 2024)



Future Climate Indicators

Indicator	Modeled History (1976 - 2005) Min - Max	Early Century (2015 - 2044)		Mid Century (2035 - 2064)		Late Century (2070 - 2099)	
		Lower Emissions Min - Max	Higher Emissions Min - Max	Lower Emissions Min - Max	Higher Emissions Min - Max	Lower Emissions Min - Max	Higher Emissions Min - Max
Precipitation:							
Days per year with no precipitation (dry days)	**157 days** 151 - 160	**159 days** 148 - 171	**159 days** 150 - 174	**160 days** 147 - 172	**160 days** 149 - 178	**160 days** 151 - 174	**163 days** 139 - 191
Maximum number of consecutive dry days	**10 days** 9 - 11	**10 days** 9 - 12	**10 days** 9 - 13	**10 days** 9 - 13	**11 days** 9 - 14	**11 days** 9 - 13	**12 days** 10 - 14
Days per year with precipitation (wet days)	**208 days** 205 - 214	**206 days** 194 - 217	**206 days** 191 - 215	**206 days** 193 - 219	**205 days** 187 - 216	**205 days** 191 - 214	**202 days** 174 - 226
Temperature thresholds:							
Annual days with maximum temperature > 90°F	**3 days** 3 - 7	**13 days** 5 - 29	**15 days** 6 - 28	**20 days** 7 - 43	**27 days** 10 - 49	**28 days** 9 - 60	**58 days** 19 - 93
Annual days with maximum temperature > 100°F	**0 days** 0 - 0	**0 days** 0 - 2	**0 days** 0 - 4	**1 days** 0 - 7	**2 days** 0 - 13	**2 days** 0 - 7	**11 days** 0 - 45

N/A = Data Not Available for the selected area

4.3.12.5 Vulnerability Assessment

Figure 4.3.12-2 shows wildfire hazard potential in Centre County (USFS, 2023). Most of the county is identified as either having "low" or "very low" hazard potential. Figure 4.3.12-3 shows wooded areas throughout Centre County in 2024. The County has significant forest coverage, which is also particularly vulnerable to wildfire events. Many municipalities in the County have more than 90 percent forest coverage particularly in the northern portion of the County. Based on the concentration of forest coverage, Burnside, Snow Shoe, Curtin, and Liberty Townships are vulnerable to wildfire hazard. More populated communities around State College Borough have less coverage but are still surrounded by a significant amount of forested land. These communities that have more developed areas adjacent to wooded land also have potentially greater vulnerability to wildfire hazard, which is also generally consistent with the high hazard potential areas in Figure 4.3.12-3.

Figure 4.3.12-1: Wildfire Hazard Potential in Centre County, 2023

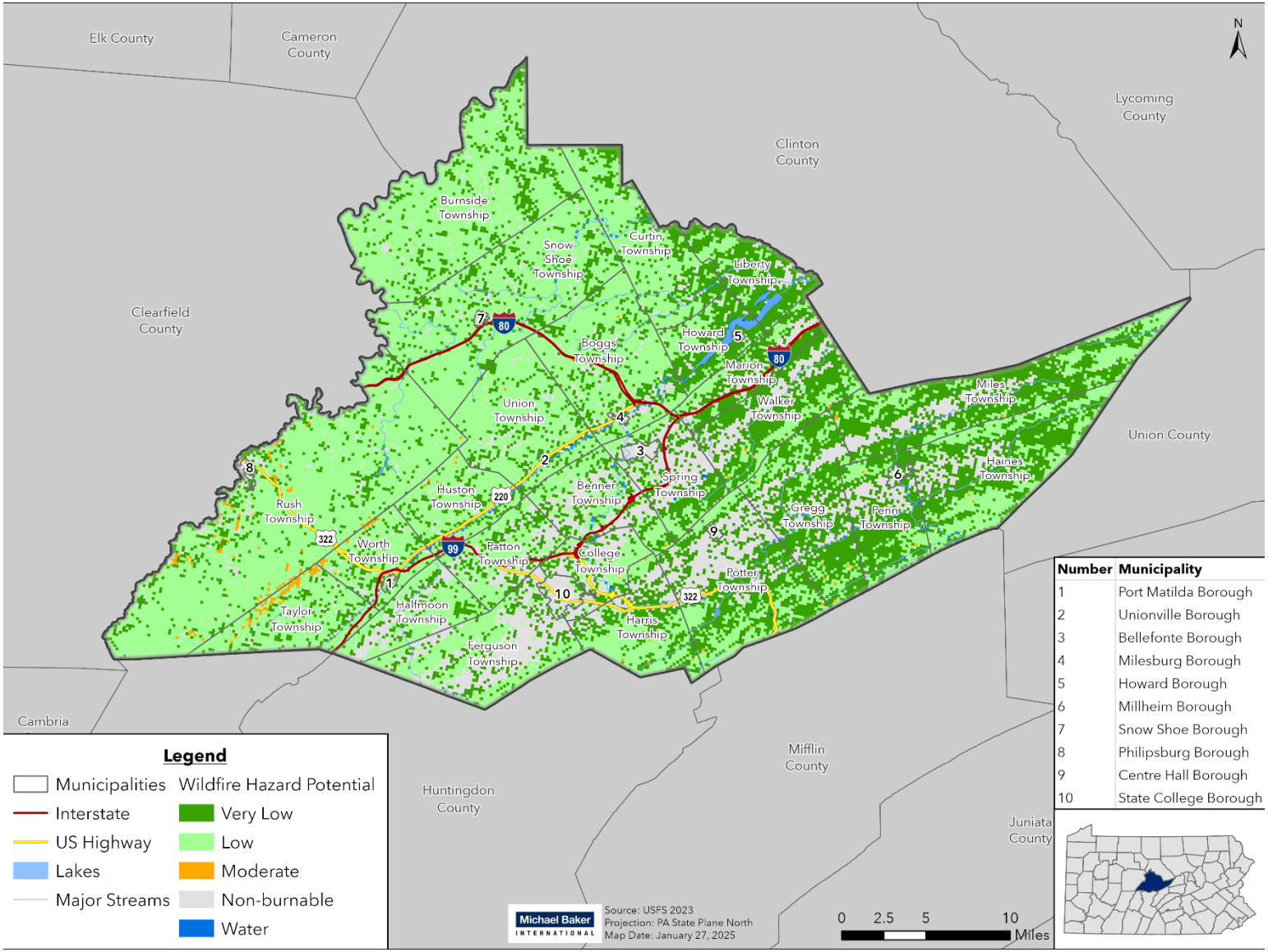


Figure 4.3.12-3: Wooded Areas in Centre County

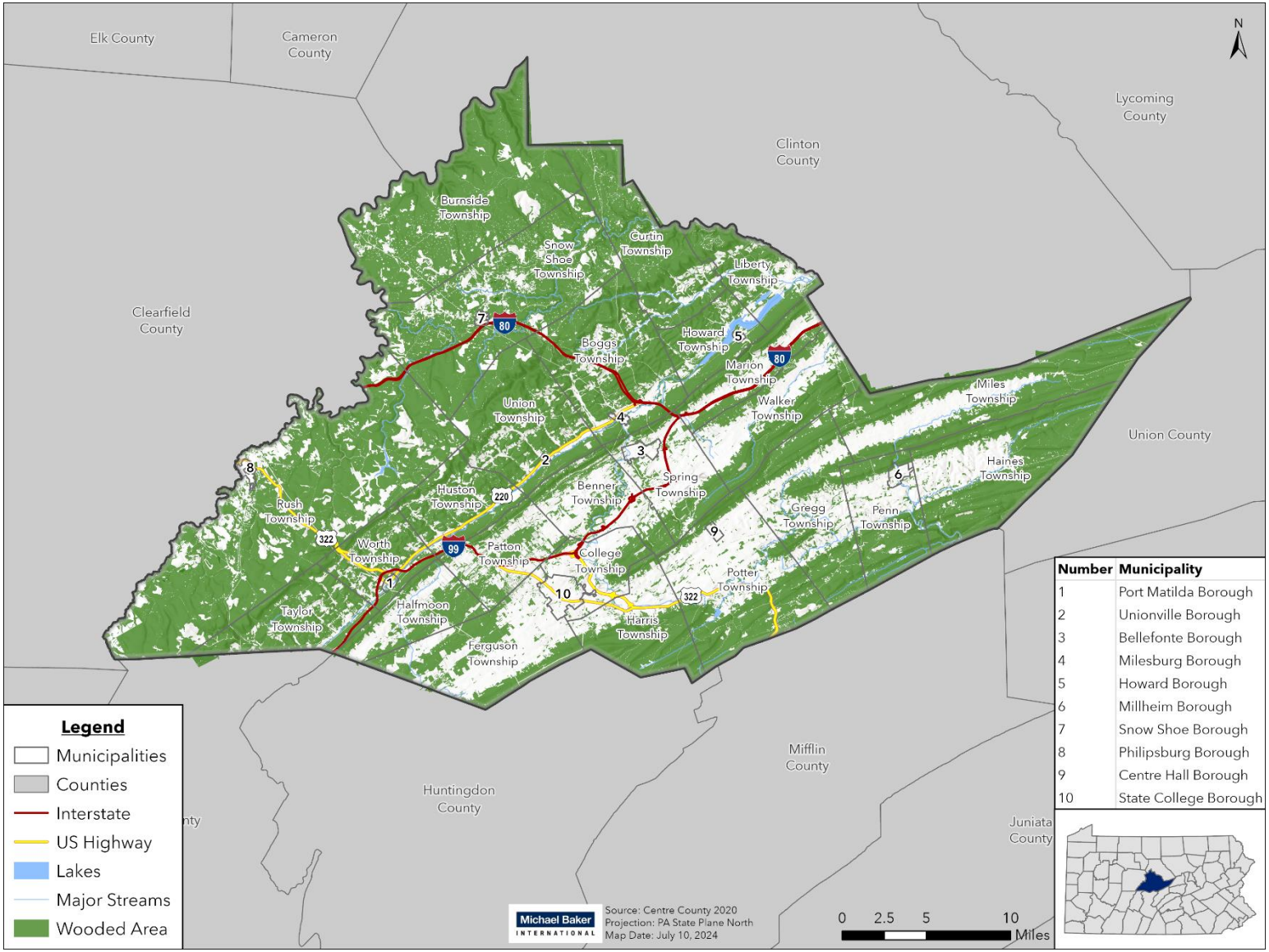


Table 4.3.12-3 lists the total addressable structures and critical facilities (excluding oil and gas wells) in each municipality that are located in forested land use areas. As indicated in the table, Potter Township has the most vulnerable structures located in wooded areas, with 259 structures. Rush and Patton Townships have the next highest number of structures in these areas, with 221 and 218, respectively. Patton Township, Ferguson Township, Penn Township and Spring Township all have two critical facilities in wooded areas. Critical facilities in wooded areas are primarily dams, day cares and water and sewer treatment plants. Wooden and natural dams in these areas could be considered for wildfire mitigation to reduce damage to dams, which could pose flood risk. There is one medical facility in vulnerable wildfire areas. Mitigation tactics like brush clearing and prescribed burns around these facilities could reduce risk to wildfire events.

Table 4.3.12-4 shows wildfire vulnerability by structure type. As discussed above, forested areas are the most susceptible to wildfire hazards.

Table 4.3.12-3: Structures and Critical Facilities Vulnerable to Wildfire, 2024

MUNICIPALITY	TOTAL STRUCTURES	TOTAL STRUCTURES IN WOODED AREAS	PERCENT STRUCTURES IN WOODED AREAS	TOTAL CRITICAL FACILITIES	CRITICAL FACILITIES IN WOODED AREAS	PERCENT CRITICAL FACILITIES IN WOODED AREAS
Bellefonte Borough	3,608	14	0.4%	21	-	0%
Benner Township	4,185	150	3.6%	26	1	4%
Boggs Township	3,300	138	4.2%	8	-	0%
Burnside Township	753	61	8.1%	3	1	33%
Centre Hall Borough	1,006	6	0.6%	5	-	0%
College Township	6,214	83	1.3%	42	1	2%
Curtin Township	1,055	97	9.2%	2	1	50%
Ferguson Township	9,125	167	1.8%	34	2	6%
Gregg Township	3,131	159	5.1%	15	-	0%
Haines Township	2,580	168	6.5%	10	1	10%
Halfmoon Township	2,148	148	6.9%	9	-	0%
Harris Township	3,803	97	2.6%	11	-	0%
Howard Borough	587	3	0.5%	9	-	0%
Howard Township	1,141	93	8.2%	6	-	0%
Huston Township	1,594	121	7.6%	2	-	0%
Liberty Township	2,430	140	5.8%	6	-	0%
Marion Township	1,346	79	5.9%	5	-	0%
Miles Township	2,770	124	4.5%	13	1	8%
Milesburg Borough	859	6	0.7%	7	-	0%
Millheim Borough	840	10	1.2%	2	-	0%
Patton Township	6,567	218	3.3%	24	2	8%
Penn Township	1,786	162	9.1%	17	2	12%
Philipsburg Borough	1,811	1	0.1%	12	1	8%

Table 4.3.12-3: Structures and Critical Facilities Vulnerable to Wildfire, 2024

MUNICIPALITY	TOTAL STRUCTURES	TOTAL STRUCTURES IN WOODED AREAS	PERCENT STRUCTURES IN WOODED AREAS	TOTAL CRITICAL FACILITIES	CRITICAL FACILITIES IN WOODED AREAS	PERCENT CRITICAL FACILITIES IN WOODED AREAS
Port Matilda Borough	458	4	0.9%	4	-	0%
Potter Township	4,648	259	5.6%	15	1	7%
Rush Township	4,587	221	4.8%	26	1	4%
Snow Shoe Borough	595	6	1.0%	3	-	0%
Snow Shoe Township	2,677	174	6.5%	6	-	0%
Spring Township	6,153	131	2.1%	30	2	7%
State College Borough	7,332	23	0.3%	42	-	0%
Taylor Township	1,281	146	11.4%	1	-	0%
Union Township	1,865	128	6.9%	7	-	0%
Unionville Borough	264		0.0%	1	-	0%
Walker Township	4,311	191	4.4%	12	-	0%
Worth Township	1,059	115	10.9%	3	-	0%
Total	**97,869**	**3,643**	**3.7%**	**439**	**17**	**4%**

Table 4.3.12-4: Structures Vulnerable to Wildfire by Municipality and Land Use Type in Centre County, 2024

MUNICIPALITY	TOTAL STRUCTURES	AGRICULTURE	COMMERCIAL	COMMUNICATIONS	FORESTS	INDUSTRIAL	MINED LAND	MIXED USE	PUBLIC OR SEMI-PUBLIC	RECLAIMED LAND	RECREATION	RESIDENTIAL	TRANSPORTATION	UTILITY	VACANT AND UNUSED LAND	VACANT STRUCTURE	WATER	TOTAL
Bellefonte Borough	3,608	-	-	-	6	-	-	-	1	-	-	7	-	-	-	-	-	14
Benner Township	4,185	4	2	1	82	-	-	-	-	-	1	60	-	-	-	-	-	150
Boggs Township	3,300	2	-	-	60	-	-	-	-	-	3	73	-	-	-	-	-	138
Burnside Township	753	1	1	1	23	-	1	-	-	-	-	29	-	4	1	-	-	61
Centre Hall Borough	1,006	-	-	-	2	-	-	-	-	-	-	4	-	-	-	-	-	6
College Township	6,214	-	1	-	29	-	-	-	2	-	1	48	1	-	1	-	-	83
Curtin Township	1,055	5	-	2	45	-	-	-	-	-	1	43	-	-	-	-	-	97
Ferguson Township	9,125	1	-	-	93	-	-	-	-	-	2	69	-	1	1	-	-	167
Gregg Township	3,131	2	-	-	98	-	-	2	-	-	-	56	-	-	1	-	-	159
Haines Township	2,580	2	-	-	33	-	-	-	-	-	52	81	-	-	-	-	-	168
Halfmoon Township	2,148	1	-	-	83	-	-	-	-	-	-	63	-	-	1	-	-	148
Harris Township	3,803	-	-	-	45	-	-	-	-	-	-	50	-	-	2	-	-	97
Howard Borough	587	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	3
Howard Township	1,141	3	1	-	26	-	-	-	-	-	36	26	-	-	-	1	-	93
Huston Township	1,594	8	3	-	48	-	-	3	-	-	-	55	-	-	4	-	-	121
Liberty Township	2,430	4	-	1	46	-	-	-	-	-	39	48	-	1	1	-	-	140
Marion Township	1,346	2	-	-	36	-	-	-	-	-	3	37	-	-	-	-	-	79
Miles Township	2,770	7	1	2	41	-	-	-	-	-	-	70	-	2	-	-	-	124

Table 4.3.12-4: Structures Vulnerable to Wildfire by Municipality and Land Use Type in Centre County, 2024

MUNICIPALITY	TOTAL STRUCTURES	AGRICULTURE	COMMERCIAL	COMMUNICATIONS	FORESTS	INDUSTRIAL	MINED LAND	MIXED USE	PUBLIC OR SEMI-PUBLIC	RECLAIMED LAND	RECREATION	RESIDENTIAL	TRANSPORTATION	UTILITY	VACANT AND UNUSED LAND	VACANT STRUCTURE	WATER	TOTAL
Milesburg Borough	859	-	-	-	2	-	-	-	-	-	-	4	-	-	-	-	-	6
Millheim Borough	840	-	-	-	7	-	-	-	-	-	-	2	-	-	1	-	-	10
Patton Township	6,567	2	1	-	84	-	-	-	1	-	1	129	-	-	-	-	-	218
Penn Township	1,786	-	-	-	41	-	-	-	-	-	55	65	-	1	-	-	-	162
Philipsburg Borough	1,811	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	1
Port Matilda Borough	458	-	-	-	2	-	-	-	-	-	-	1	-	-	1	-	-	4
Potter Township	4,648	4	3	-	121	-	-	-	1	-	51	77	-	2	-	-	-	259
Rush Township	4,587	-	-	2	150	-	-	-	1	-	4	59	-	4	1	-	-	221
Snow Shoe Borough	595	-	-	-	4	-	-	-	-	-	-	2	-	-	-	-	-	6
Snow Shoe Township	2,677	5	1	-	96	-	-	-	-	-	-	63	-	3	5	-	1	174
Spring Township	6,153	4	-	3	72	-	-	-	-	-	7	22	-	1	22	-	-	131
State College Borough	7,332	-	-	-	6	-	-	-	-	-	5	12	-	-	-	-	-	23
Taylor Township	1,281	12	5	-	48	2	-	-	3	-	-	71	-	-	4	-	1	146
Union Township	1,865	-	-	-	90	-	-	-	-	-	-	38	-	-	-	-	-	128

Table 4.3.12-4: Structures Vulnerable to Wildfire by Municipality and Land Use Type in Centre County, 2024

MUNICIPALITY	TOTAL STRUCTURES	AGRICULTURE	COMMERCIAL	COMMUNICATIONS	FORESTS	INDUSTRIAL	MINED LAND	MIXED USE	PUBLIC OR SEMI-PUBLIC	RECLAIMED LAND	RECREATION	RESIDENTIAL	TRANSPORTATION	UTILITY	VACANT AND UNUSED LAND	VACANT STRUCTURE	WATER	TOTAL
Unionville Borough	264	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0
Walker Township	4,311	1	-	-	79	-	-	-	-	-	10	101	-	-	-	-	-	191
Worth Township	1,059	2	-	1	48	-	-	1	2	-	-	61	-	-	-	-	-	115
Total	**97,869**	**72**	**19**	**13**	**1,650**	**2**	**1**	**6**	**11**		**271**	**1,526**	**1**	**19**	**46**	**1**	**2**	**3,643**

Table 4.3.12-5 shows the number of oil and gas wells located in wildfire hazard areas. All municipalities with wells have at least one well that is vulnerable to wildfire hazard. The municipality with the most vulnerable wells is Burnside Township (255).

Table 4.3.12-5: Conventional and Unconventional Oil and Gas Well Wildfire Vulnerability in Centre County, 2024

MUNICIPALITY	TOTAL OIL AND GAS WELLS	TOTAL OIL AND GAS WELLS IN WOODED AREAS	PERCENT OIL AND GAS WELLS IN WOODED AREAS
Boggs Township	54	26	48.1%
Burnside Township	691	255	36.9%
Curtin Township	187	121	64.7%
Liberty Township	2	1	50.0%
Marion Township	1	0	0.0%
Rush Township	60	23	38.3%
Snow Shoe Township	607	250	41.2%
Taylor Township	2	2	100.0%
Union Township	7	3	42.9%
Worth Township	3	1	33.3%
Countywide Total	**1,614**	**682**	**42.3%**

Centre County residents are protected by 28 fire companies, all of which are volunteer departments (Centre County Fire, 2024). Reliance on volunteers is not likely to change as the county will remain largely rural in character. Fire companies, particularly volunteer fire companies, face significant challenges today and into the future. Maintaining sufficient numbers of capable volunteers is an omnipresent concern for volunteer fire companies throughout the Commonwealth and County. The pool of available volunteers has been steadily declining, a trend likely to continue throughout the next planning period. The statewide decline in volunteers is driven by many factors, all of which are common to Centre County: economic pressures necessitating dual income households, loss of local employment opportunities, and reduced reliance on service organizations for social activity and networking. These pressures are not expected to result in the loss of any individual fire company.

4.3.12.6 Equity in Vulnerable Communities

Communities in rural areas are more susceptible due to potential proximity to large fire-prone wooded areas. These areas may have limited evacuation routes, increasing the risk for residents in the path of wildfires. Additionally, households with people with disabilities, specifically related to lung or respiratory issues, are going to be at an increased risk of harm, and county hospitals should be prepared. This means areas of Boggs Township, Milesburg Borough, Potter Township, Centre Hall Borough, Curtin Township, Liberty Township, Howard Township, Howard Borough, and Gregg Township may be particularly vulnerable.

4.3.13 Winter Storm



4.3.13.1 Location and Extent

Heavy snow or ice occurs throughout the Commonwealth of Pennsylvania. Every municipality in Centre County is affected by these storms. Centre County experiences all levels of winter storms from ice storms and freezing rain to heavy snow and blizzards. Generally, the average annual snowfall is consistent throughout the County, with the area receiving between 30 and 48 inches of snow annually (see Figure 4.3.13-2 below) (NOAA NWS, 2024a). This dataset from NOAA in 2021 is the most current, comprehensive, and publicly available geospatial data at the time of this Plan Update. This map continues to depict current conditions.

According to the NWS, median winter season snowfall from 1991 through 2020 is 43.8 inches in State College. Figure 4.3.13-1 shows seasonal snowfall at the State College, PA Co-Operative Observation Site since 1980. Additionally, data from the 1980-2022 30-year average indicates that snowfall remains heavier in the northwestern part of the County as shown in Figure 4.3.13-2.

Figure 4.3.13-1: Seasonal Snowfall at State College, PA Co-Operative Observation Site, 1980-2022 (NOAA NWS, 2024b).

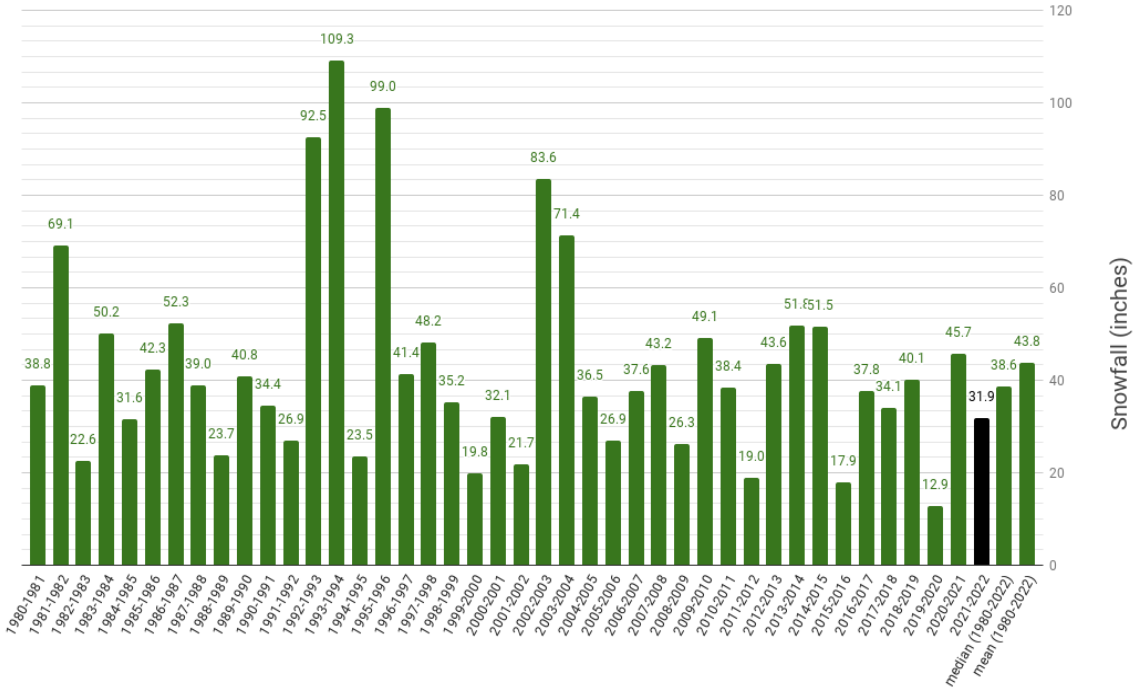
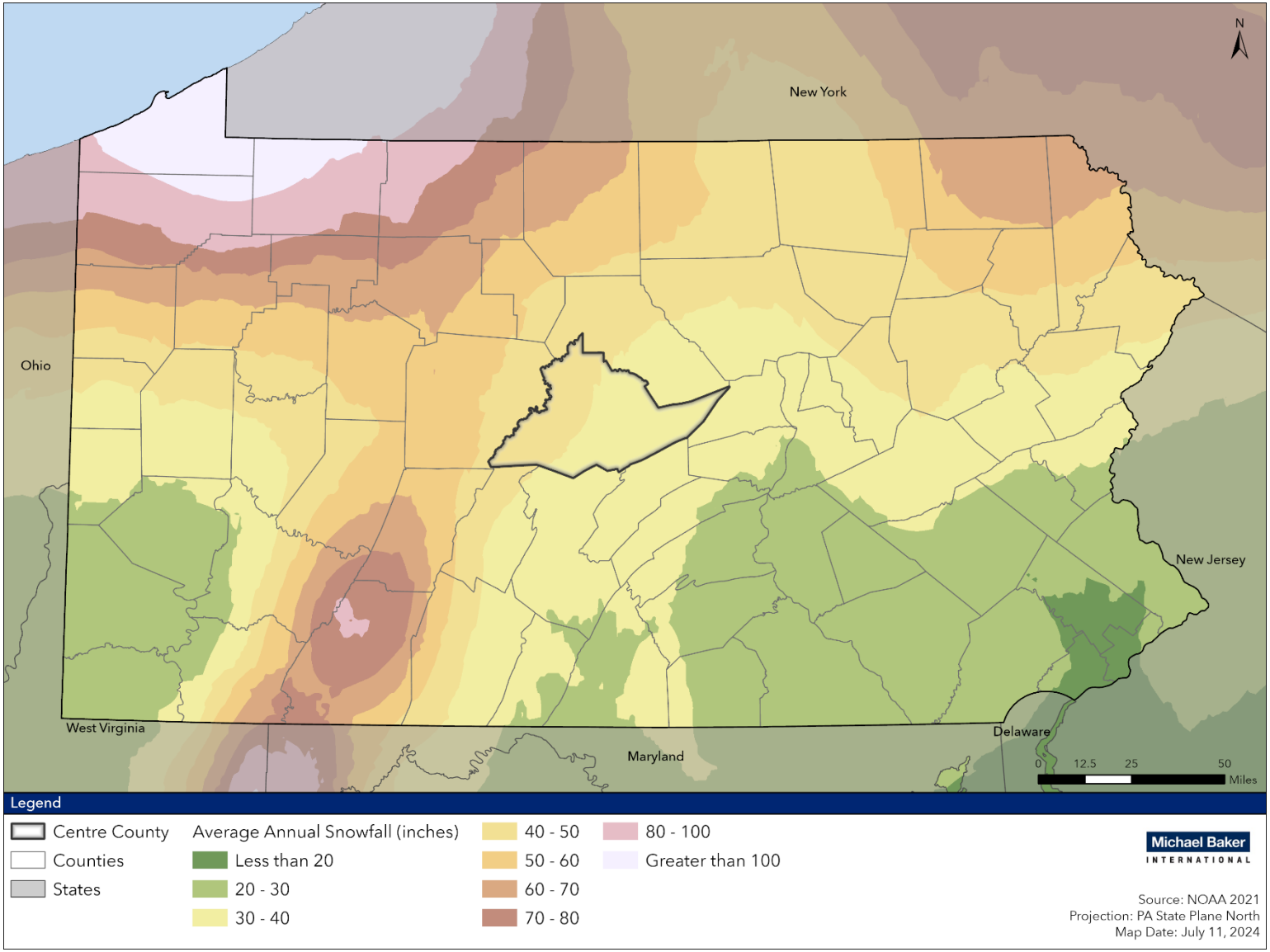


Figure 4.3.13-2: Mean Annual Snowfall for Pennsylvania and Centre County, 2021



4.3.13.2 Range of Magnitude

Winter storms consist of cold temperatures, heavy snow or ice and sometimes strong winds. Because winter storms are a regular occurrence in Centre County, they are considered hazards only when they result in damage to specific structures and/or overwhelm local capabilities to handle disruptions to traffic, communications, and electric power. The cost of removing snow, repairing damages, especially from ice storms, and the loss to businesses can have a negative economic impact for communities. Winter storms can generate other hazards such as infrastructure disruption (blocked roads and power outages), human-caused hazards (traffic accidents and trapped vehicles), and technological problems (communication system outages and overload). Winter storms can adversely affect roadways, utilities, business activities, and can cause loss of life, frostbite, or freezing.

Winter storms can include one or more of the following weather events:

1. Heavy Snowstorm: Accumulations of four inches or more in a six-hour period, or six inches or more in a 12-hour period.
2. Sleet Storm: Sleet if formed when snow falling to the earth partially melts as it passes through a layer of warm air. The precipitation then passes through a cold layer of air and refreezes into solid pellets. Sleet causes surfaces to become slippery, posing hazards to pedestrians and motorists.
3. Ice Storm: An ice storm occurs when rain freezes upon impact with the ground or other objects such as trees and power lines. Heavy accumulations of ice can bring down trees and utility poles, disrupting power and communication for days while crews make the necessary repairs. The icy conditions are also dangerous for pedestrians and vehicular traffic.
4. Blizzard: According to NWS, a blizzard is a severe snowstorm that occurs when winds reach 35 mph or more. The blowing snow reduces visibility to less than one-quarter of a mile for at least three hours. Storms that meet these criteria are not frequent in Centre County; however, storms that produce blizzard-like conditions are a common occurrence.
5. Severe Blizzard: Wind velocity of 45 mph, temperatures of 10° Fahrenheit or lower, a high density of snow with visibility frequently measured in feet prevailing over an extended period time.

Any of the above events can result in the closing of secondary roads, particularly in rural locations, loss of utility services and depletion of oil heating supplies. Environmental impacts often include damage to shrubbery and trees due to heavy snow loading, ice build-up and/or high winds, which can break limbs or even bring down large trees.

Gradual melting of snow and ice provides excellent groundwater recharge. However, high temperatures following a heavy snowfall can cause rapid surface water runoff and severe flooding. The blizzard of 1996, one of several winter storm events documented in Section 4.3.13.3, represents the largest impact Centre County is anticipated to encounter from a winter storm hazard. During this event, heavy snow fell on the County over two days, resulting in two to three feet of snow in places. This event was exacerbated when rainfall and unusually warm temperatures resulted in flooding due to extensive melting of the snowpack. County specific damage estimates were unavailable, but damages for the entire Susquehanna River basin had been estimated at $600M (NOAA NWS, 1996). A storm of this magnitude could be considered a worst-case scenario winter storm for Centre County.

The potential impacts of winter storms on community lifelines are as follows:

Table 4.3.13-1: Most Likely Lifelines Impacted by Winter Storm

LIFELINES	NOTES
	Government administrative services may be impacted through transportation infrastructure issues and community safety may be threatened due to potential harm from storm impacts.
	Winter storms can cause damage to structures and water utility infrastructure, while the food supply chain may be disrupted due to impacts on transportation infrastructure.
	Potential direct damage to infrastructure and then potential increased fuel use for those who lost access to electrical heating may occur.
	Transportation lifeline in response and recovery due to direct damage to infrastructure and dangerous road conditions.

4.3.13.3 Past Occurrence

The Commonwealth of Pennsylvania has a long history of severe winter weather. In March of 1993, declaration of a state-wide snow emergency restricted travel on all state highways. Snowfall varied throughout the County from 14 to 36 inches with snow drifts up to 10 feet in some places. The Blizzard of 1996, which began Sunday, January 7, 1996, brought an additional 18 inches of snow on top of 10 inches already on the ground. As discussed in Section 4.3.4, extensive severe flooding occurred when heavy rains melted the 28 inches snowpack five days later, causing Governor Ridge to declare

a state of emergency. In October 2002, there were widespread, prolonged power outages in some areas of the County, including the heavily populated Centre Region, due to heavy, wet snow and ice accumulations that resulted in $1 million worth of property damages in northern Centre County.

Sudden snow squalls where interstate highways, such as I-80, I-99, and US-322, traverse the mountains can also create a hazard to these high traffic areas. As an example, on January 6, 2004, Centre County experienced its first large scale chain reaction pileup on I-80. This accident occurred when a sudden snow squall caused the roadway to flash freeze and created whiteout conditions. During this incident, forty-seven vehicles, including 30 tractor trailers, crashed, killing six and injuring at least 11 people enough to require emergency medical transport.

Emergency responders from 84 agencies from Centre County and seven other counties battled frigid temperatures to extinguish fires that caused multiple explosions. The situation was further complicated when 80 drums of hazardous waste in a tractor trailer in the middle of the pile began to leak. See Section 4.3.19 for more information about transportation incidents.

Mean annual snowfall in Centre County can range from 30 to 48 inches (NOAA NWS, 2024a). Three of the fifteen Presidential Disaster and Emergency Declarations affecting Centre have been in response to hazard events related to winter storms (see Table 4.2-1). The number of winter storm events occurring each year in Centre County and associated damages are listed in Table 4.3.13-2.

Table 4.3.13-2: Previous Winter Storm Events Impacting Centre County from 1996-2022 (NOAA NCEI, 2024)

YEAR	NUMBER OF EVENTS	DAMAGES ($)
1996	8	Not provided
1997	8	Not provided
1998	5	Not provided
1999	11	Not provided
2000	8	Not provided
2001	2	$8,000
2002	10	$ 1,000,000
2003	8	Not provided
2004	12	Not provided
2005	13	Not provided
2007	10	Not provided

Table 4.3.13-2: Previous Winter Storm Events Impacting Centre County from 1996-2022 (NOAA NCEI, 2024)

YEAR	NUMBER OF EVENTS	DAMAGES ($)
2008	11	Not provided
2009	9	Not provided
2010	3	Not provided
2011	5	Not provided
2012	3	Not provided
2013	4	Not provided
2014	10	Not provided
2015	4	Not provided
2016	2	Not provided
2017	4	Not provided
2018	2	Not provided
2019	5	Not provided
2020	2	Not provided
2021	5	Not provided
2022	5	Not provided
Total	**169**	**$1,008,000**

Stakeholders during the 2021 Plan Update process provided additional information about winter storm incidents throughout Centre County, which included:

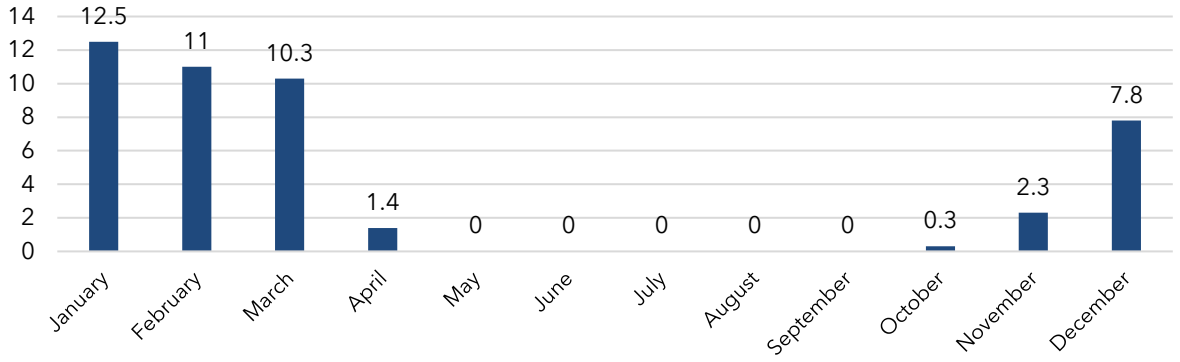
- It is essential to maintain Route 144 through Snow Shoe Borough since I-80 traffic diverts to this road during snow storms and causes traffic problems
- Winter storms impact all Marion Township roads
- Winter storms impact the wooded neighborhoods of Park Forest Village (Patton and Ferguson Townships) and College Heights (State College Borough)
- During the 2025 Plan Update Process, stakeholders indicated that winter storms have been less frequent, and less severe in the past couple of years.

4.3.13.4 Future Occurrence

Approximately 35 winter storms occur across Pennsylvania and about five occur in Centre County annually. Winter storms are a regular, annual occurrence in Centre County and should be considered *likely* as defined by the Risk Factor methodology probability criteria (see Table 4.4-1). Figure 4.3.13-3 shows the 1981-2010 snowfall normal as recorded at the State College Weather Station. As shown, State College

experiences regular snowfall during winter months, particularly from December to March.

Figure 4.3.13-3: 30-Year Snowfall Normal (Inches) by Month at State College Weather Station (NOAA NCEI, 2020b)



As discussed in Section 4.3.4, climate projections shows that while precipitation totals are expected to increase, the number of days below 32 degrees Fahrenehit may decrease. This may lead to a decrease in the number of winter storms. That said, the polar jet stream and arctic warming may play a part in large-scale storms still being a potential hazard. Cohen, Pfeiffer, and Francis (2018) posited that warming Artic temperatures have led to a weakening of the polar jet stream, which has allowed warmer, yet still very cold, artic air to travel southward and provide the other half of the equation for the intense winter storms seen in the Northeast United States. There is a possibility these storms continue to occur and may even occur more frequently, with the warming Atlantic Ocean generating more and more fuel and the potential for more intense hot air-cold air clashes that strengthen storms (Feuerstein, 2022). However, this study has been criticized due to the small size of the 35-year sample and the potential for compounding factors impacting the data, as various climate modeling techniques have so-far been unable to reproduce the effect and confirm the linkage (Blackport and Screen, 2020). More studies are ongoing.

4.3.13.5 Vulnerability Assessment

In Centre County, accumulations of snow and/or ice during winter months are expected and normal. The most common detrimental effects of snow and/or ice are not collapsed structures but traffic accidents and interruptions in power supply and communications services.

Some rural areas of the county are susceptible to isolation due to the loss of telephone communication and road closings. Power failures and interruption of water supplies are

not uncommon from ice storms as well as heavy snow or blizzard conditions. These include the more sparsely populated areas of Liberty, Curtin, Snow Shoe, Burnside and Rush Townships, and remote farms in Miles, Haines, and Penn and Gregg Townships. There are also small mountain communities, such as Monument and Orviston, which are particularly at risk of isolation because of their mountaintop locations. A few areas have been isolated for as long as eight days. Emergency medical supplies, food, and fuel are sometimes required during these storms. Particular areas of vulnerability include low-income and elderly populations, mobile homes, and infrastructure such as roadways and utilities that can be damaged by such storms and the low-lying areas that can be impacted by flooding related to rapid snow melt.

Motorists may occasionally become stranded on major highways, especially I-80 in Snow Shoe Township, during these storms. Stranded motorists are also likely on I-99 and US 322 in remote and mountain locations, as in such corridors found in Taylor and Rush Townships.

Vulnerability to the effects of winter storms on buildings is somewhat dependent on the age of a building because as building codes become more stringent, buildings can support heavier loads and as buildings age, various factors may deteriorate their structural integrity. Vulnerability also depends upon the type of construction and the degree to which a structure has been maintained.

Critical facilities would be impacted by a storm event, but these structures are largely constructed of concrete and masonry; therefore, they should only suffer minimal structural damage. Because power interruption can occur, backup power is recommended for critical facilities and infrastructure.

The most vulnerable structures are those that were poorly built or are dilapidated. The weight of heavy snow or ice may lead to structural collapse or to minor damage. Some shed roofs that protect township and borough road maintenance or firefighting equipment have large span roofs that may collapse under the weight of especially heavy snow or ice although none have collapsed due to recent heavy snow or ice storms.

All structures and infrastructure in Centre County are exposed to heavy snow and ice. For this analysis, structures built prior to 1940 are identified as being potentially at risk of being somewhat weakened and more susceptible to damage due to heavy snow or ice. The following table shows the number of housing units in Centre County built prior to 1940 according to the ACS 2022 five-year estimates. State College Borough has the most structures of any municipality in the county built prior to 1940 (over 1,500). However, Howard and Unionville Boroughs have the largest proportion of housing units built prior to 1940 (54.3 and 62.9 percent, respectively). While the U.S. Census Bureau

provides estimates for residential structures, the age of non-residential structures is not available.

Table 4.3.13-3: Housing Units Built Prior to 1940 in Centre County (U.S. Census Bureau, 2018-2022)

MUNICIPALITY	NUMBER OF HOUSING UNITS BUILT PRIOR TO 1940	PERCENT OF TOTAL HOUSING UNITS
Bellefonte Borough	1,342	13.8%
Benner Township	127	1.3%
Boggs Township	198	2.0%
Burnside Township	35	0.4%
Centre Hall Borough	269	2.8%
College Township	330	3.4%
Curtin Township	98	1.0%
Ferguson Township	468	4.8%
Gregg Township	376	3.9%
Haines Township	317	3.3%
Halfmoon Township	70	0.7%
Harris Township	160	1.6%
Howard Borough	146	1.5%
Howard Township	42	0.4%
Huston Township	59	0.6%
Liberty Township	199	2.0%
Marion Township	76	0.8%
Miles Township	205	2.1%
Milesburg Borough	189	1.9%
Millheim Borough	146	1.5%
Patton Township	177	1.8%
Penn Township	148	1.5%
Philipsburg Borough	632	6.5%
Port Matilda Borough	125	1.3%
Potter Township	198	2.0%
Rush Township	552	5.7%
Snow Shoe Borough	66	0.7%
Snow Shoe Township	184	1.9%
Spring Township	744	7.7%
State College Borough	1,557	16.0%

Table 4.3.13-3: Housing Units Built Prior to 1940 in Centre County (U.S. Census Bureau, 2018-2022)

MUNICIPALITY	NUMBER OF HOUSING UNITS BUILT PRIOR TO 1940	PERCENT OF TOTAL HOUSING UNITS
Taylor Township	56	0.6%
Union Township	92	0.9%
Unionville Borough	66	0.7%
Walker Township	236	2.4%
Worth Township	33	0.3%
Total	**9,718**	**14.79%**

As all structures and infrastructure in Centre County will be exposed to heavy snow and ice, all of Centre County has adopted the 2009 IBC and IRC building codes. New construction will be able to withstand the weight of heavy snow or ice.

4.3.13.6 Equity in Vulnerable Communities

During winter storms there will be a disproportionate impact on low-income and marginalized communities. Low-income families are more likely to live in poorly insulated or older homes that are less able to withstand extreme cold. These homes may lack sufficient heating, insulation, and weatherproofing, making them more vulnerable to damage from ice, snow, and cold temperatures. Many low-income households also experience energy insecurity and may struggle to afford heating during winter months. Energy shutoffs due to unpaid bills can leave them dangerously exposed to cold weather. Elderly households or households with people with disabilities may also face additional challenges due to mobility issues. Icy conditions, snow buildup, and impassable roads or sidewalks can prevent them from leaving their homes. This means areas of Boggs Township, Milesburg Borough, Curtin Township, Liberty Township, Howard Township, Howard Borough, Patton Township, College Township, Ferguson Township, Gregg Township, Spring Township may be particularly vulnerable.

HUMAN-MADE HAZARDS

4.3.14 Civil Disturbance



4.3.14.1 Location and Extent

Civil disturbance is a broad term that is typically used by law enforcement to describe one or more forms of disturbance caused by a group of people. Civil disturbances are typically a symptom of, and a form of protest against, major socio-political problems. Civil disturbance hazards include the following:

- Famine: Involving a widespread scarcity of food leading to malnutrition, increased mortality, and a period of psychosocial instability associated with the scarcity of food, such as riots, theft of food, and the falls of governments caused by political instability borne of an inability to deal with the crisis caused by famine (IPC, 2024).
- Economic Collapse, Recession: Very slow or negative growth (The Economist, 2009).
- Misinformation: Erroneous information spread unintentionally (Makkai, 1970).
- Civil Disturbance, Public Unrest, Mass Hysteria, Riot: Group acts of violence against property and individuals, for example (18 U.S.C. § 232, 2008).
- Strike, Labor Dispute: Controversies related to the terms and conditions of employment, for example (29 U.S.C. § 113, 2008).

Typically, the severity of the action coincides with the level of public outrage. In addition to a form of protest against major socio-political problems, civil disturbances can also arise out of union protest, institutional population uprising, or from large celebrations that become disorderly.

The scale and scope of civil disturbance events varies widely. However, government facilities, landmarks, prisons, and universities are common sites where crowds and mobs may gather. Several civil disorder events have been recorded in recent Centre County history. The student population of Penn State University and the population influxes during big events sometimes lead to spontaneous celebrations that create problems requiring external support.

Concentrations of large crowds has typically occurred in the 200 and 300 blocks of Beaver Avenue in State College Borough, known locally as Beaver Canyon where it is flanked by apartment towers. In this location, mobs have caused extensive damage to motor vehicles, business places, and other property. There were also personal injuries

to rioters and police. These events required aid from police agencies from all parts of the County, and, for the larger riots, other parts of the State. They resulted in numerous arrests.

In recent years there have been demonstrations at County facilities, including the County Courthouse. Demonstrators have protested around local and national topics. These locations are likely places for public demonstrations in the future. In 2019, Centre County commissioners adopted an ordinance that establishes guidelines for security on County property. Anyone that enters County property is subject to searches of persons, packages, and containers, as well as monitoring by security cameras. The ordinance also established a Security Committee, which is tasked with proposing security procedures, policies, and/or ordinances to the County Board of Commissioners regarding County Property (Centre County, 2019a). The State Correctional Institution (SCI) at Rockview also has the potential for large-scale civil disorder, though this has never occurred to date. Rockview, is located in Benner Township, off Pennsylvania Route 26 north of State College, at the foot of Mount Nittany in the Nittany Valley. It is a medium-security institution for male prisoners, and currently houses over 2,200 inmates (PA DOC, 2024). Additionally, SCI Benner, also in Benner Township, is a medium-security facility that opened in 2013 and houses more than 1,500 inmates (PA DOC, 2024). This facility is also vulnerable to civil disturbance incident.

4.3.14.2 Range of Magnitude

Civil disturbances can take the form of small gatherings or large groups blocking or impeding access to a building or disrupting normal activities by generating noise and intimidating people. They can range from a peaceful sit-in to a full-scale riot, in which a mob burns or otherwise destroys property and terrorizes individuals. Even in its more passive forms, a group that blocks roadways, sidewalks, or buildings interferes with public order. There are two types of large gatherings typically associated with civil disturbances: a crowd and a mob. A crowd may be defined as a casual, temporary collection of people without a strong, cohesive relationship. Crowds can be classified into four categories (PEMA, 2023):

1. Casual Crowd: A casual crowd is a group of people who happen to be in the same place at the same time. Violent conduct does not occur.
2. Cohesive Crowd: A cohesive crowd consists of members who are involved in some type of unified behavior. Members of this group are involved in some type of common activity, such as worshipping, dancing, or watching a sporting event. They require substantial provocation to arouse to action.
3. Expressive Crowd: An expressive crowd is one held together by a common commitment or purpose. Although they may not be formally organized, they are

assembled as an expression of common sentiment or frustration. Members wish to be seen as a formidable influence. One of the best examples of this type is a group assembled to protest for a cause.

4. Aggressive Crowd: An aggressive crowd is comprised of individuals who have assembled and are visibly angry or violent. This crowd often has leaders who attempt to arouse the members or motivate them to action. Members are noisy and threatening and will taunt authorities. They may be more impulsive and emotional and require only minimal stimulation to arouse violence.

A mob can be defined as a large disorderly crowd or throng. Mobs are usually emotional, loud, tumultuous, violent, and lawless. Similar to crowds, mobs have different levels of commitment and can be classified into four categories (Alvarez and Bachman, 2008):

- Aggressive Mob: An aggressive mob is one that attacks, riots and terrorizes. The object of violence may be a person, property, or both. An aggressive mob is distinguished from an aggressive crowd only by lawless activity. Examples of aggressive mobs are the inmate mobs in prisons and jails, mobs that act out their frustrations after political defeat, or violent mobs at political protests or rallies.
- Escape Mob: An escape mob is attempting to flee from something such as a fire, bomb, flood, or other catastrophe. Members of escape mobs are generally difficult to control can be characterized by unreasonable terror.
- Acquisitive Mob: An acquisitive mob is one motivated by a desire to acquire something. Riots caused by other factors often turn into looting sprees. This mob exploits a lack of control by authorities in safeguarding property.
- Expressive Mob: An expressive mob is one that expresses fervor or revelry following some sporting event, religious activity, or celebration. Members experience a release of pent up emotions in highly charged situations.

The worst-case scenario for Centre County would be an aggressive crowd or an expressive mob protesting on or within a major thoroughfare, most likely formed near a major educational institution or headquarters. This scenario would also involve property damage comparable to or greater than that which occurred in the riots of 1998 and 2011, which are discussed in Section 4.3.14.3.

The following community lifelines are at risk during a civil disturbance:

Table 4.3.14-1: Most Likely Lifelines Impacted by Civil Disturbance

LIFELINES	NOTES
Health and Medical	Community safety may be at risk requiring police intervention.
Transportation	Medical personnel might be needed for response and recovery as participants may be injured, injure others, and demonstrations may impede emergency service operations.
Safety and Security	Community safety may be at risk requiring police intervention.

4.3.14.3 Past Occurrence

Notable civil disturbance events include the 1980 Penn State University Employees Strike, the 1982 Nebraska-Penn State Football Game, the 1982 and 1986 Penn State National Football Championships, the Central Pennsylvania Festival of the Arts in both 1998 and 2000, and in March 2001 after Penn State's defeat in the National College Athletic Association (NCAA) Basketball playoffs.

A damaging event occurred on July 12, 1998 at the Central Pennsylvania Festival of the Arts. A mob of approximately 1,500 resulted in $150,000 in property damage, more than 20 arrests, and 14 injured police officers.

On October 25, 2008, after the 13-6 Penn State win against the Ohio State Buckeyes, Nittany Lions fans celebrated by pulling down poles and signs and tossing objects out of balconies. Police arrived in riot gear to break up the crowd. Celebrations began at 11:30 p.m. and did not get cleared until around 1:30 a.m. The most damage done in this incident was to nearby cars, with several small fires that were quickly put out. Police made 14 arrests in the immediate aftermath (Miller, 2008).



Figure 4.3.14-1: Riot at Penn State University in December 2011 (Penn State University, 2015a)

The most destructive riot since the 1990s occurred in December 2011 after the firing of Penn State's football coach Joe Paterno. Thousands of students rioted, causing an estimated $190,000 in property damage and 38 people were charged with participating in the destructive behavior (Ganim, 2011).

A large fraction of police force duties involves the monitoring of drinking and drinking-related activities near the campus. There are about 60 incidents, which include underage drinking, disorderly conduct, and public drunkenness, on the average football game day.

Between 2015 and 2017 there were a series of protests held at the County Courthouse in Bellefonte Borough, also the location of the County Administrative Building. Demonstrators claimed there were accounts of corruption through forgery and inappropriate conduct between court officials. Protests remained peaceful with picketers returning to the same place to demonstrate (Falce, 2017).



Figure 4.3.14-2: Demonstration in support of the Black Lives Matter movement in June, 2020 (Centre Daily Times, 2020)

The 3/20 Coalition was formed in 2019 after a State College resident, Osaze Osagie, was fatally shot by police. In late May 2020, an uprising against racism and police brutality swept the nation. Triggered by the murder of George Floyd by Minneapolis Police in Minnesota, groups in cities and towns across the country hosted protests for several weeks, including Centre County. Having experienced a similar tragedy to the one in Minnesota, the State College community held their own demonstrations (Hogge, 2020). Protests were held in State College, Bellefonte, and Philipsburg Boroughs, some with hundreds of attendees. Public demonstrations spanned several weeks of summer 2020, despite threat of the COVID-19 pandemic. Police protests were largely non-violent in Centre County, employing tactics like blocking traffic but avoiding property damage (Centre Daily Times, 2020).

In October 2022, protestors and counter-protesters confronted each other outside the Thomas Building on Penn State's campus before a campus event featuring Proud Boys founder Gavin McInnes and Alex Stein. A physical confrontation ensued, including individuals and police officers being pepper sprayed. The event was eventually

cancelled and those in the area were dispersed by police in riot gear and on horseback (Chappell, 2022). Officers from four local police departments and around 70 members of the State Police were present to control the crowd (Massey, 2023).

In April 2024, amidst a growing movement on college campuses across the country, around 200 Penn State students and State College community members held a protest and march against the United States' involvement in the Israel-Palestine conflict and the university's role in accepting federal funding for weapons research. Protestors gathered before marching down West College Avenue and then returning to campus for a protest at Old Main. Campus police and State College police were present on the scene, with a handful of officers standing in front of the Applied Research Lab (ARL)'s door. No arrests were made, and no damage was reported before protestors dispersed (Kines and Moyer, 2024).

Nationwide events can be unprecedented and difficult to predict. However, after actions begin authorities can expect them to continue and prepare for upcoming events.

4.3.14.4 Future Occurrence

Civil disturbance is always a possibility as long as there is discrimination or other perceived social or economic injustices. However, it may be possible to recognize the potential for an event to occur in the near-term. For example, an upcoming significant sporting event at one of the colleges or universities in the Commonwealth may result in gathering of large crowds or immediately after significant national news involving political or social debates. Local law enforcement should anticipate these types of events and be prepared to handle a crowd so that peaceful gatherings are prevented from turning into unruly public disturbances. Therefore, the probability of civil disturbance occurring in Centre County is considered *possible* as defined by the Risk Factor Methodology probability criteria (see Table 4.4-1).

4.3.14.5 Vulnerability Assessment

Centre County is most vulnerable to civil disturbance events in Four communities: Benner Township, College Township, Miles Township and State College Borough. However, response training and anticipation to disturbances have diminished associated impacts and damages. Following the events of the Arts Fest Riot in 1998, the State College Police brought in a riot control expert and invested in riot gear and special training. This greatly increased the response capability and ability to more rapidly diffuse situations. Steps have also been taken along the 'Beaver Canyon' stretch in State College. Video surveillance has been added in key intersections as a deterrent. Officials continue to work with residents to discourage throwing items off balconies, and to

address the vulnerabilities in the area. Both SCI's Rockview and Benner maintain disturbance response plans. There are mutual aid agreements between the County's police agencies, Penn State University, and the SCIs to assist one another and supply resources to respond to civil disorders. These include agreements of support from external agencies such as community emergency services, State Police, and the National Guard (Small, 2008).

Jurisdictional losses for civil disturbance events are difficult to predict and can vary significantly in range. For example, the State College Riot in July 1998, fueled by alcohol consumption, resulted in approximately $150,000 in damages. The three communities identified in this section are locations where such events are more likely to occur and therefore should be considered more vulnerable. Adequate law enforcement at these locations minimizes the changes of a small assembly of people turning into a significant disturbance. This will ensure improved response times, optimal communications, and containment of the event as during these events major roadways can be blocked and disturb traffic and larger events may involve the interruption or removal of communication. More broadly, in the case of large civil disturbance events, the County may incur losses related to work stoppages in addition to any acts of vandalism that my occur. Failure to pursue a program of civil disturbance awareness may result in increased loss of lives and property.

4.3.14.6 Equity in Vulnerable Communities

In terms of equity, communities with less access to the internet and smartphones may have difficulties getting updates on the state of a civil disturbance. This includes most of the rural municipalities in the county. Outreach should also be provided in secondary languages in municipalities such as State College Borough, Patton Township, College Township, and Miles Township who have higher concentrations of households with limited English. Ensuring that evacuation plans and recovery services are accessible to everyone is critical.

4.3.15 Cyber Terrorism



4.3.15.1 Location and Extent

Cyber terrorism is a broad term that refers to acts associated with the convergence of terrorism and cyberspace. Generally, cyberterrorism involves unlawful attacks or threats against computers, networks, and the information stored therein to intimidate or coerce a government or its people to achieve political or social objectives (Denning, 2000). These acts can range from taking control of a host website, to using networked resources to directly cause destruction and harm. Table 4.3.1.15-1 includes the types and methods of cyberattacks as defined by the Pennsylvania Department of Homeland Security (PA DHS, 2017).

Table 4.3.15-1: Methods of Cyberattacks (PA DHS, 2017)

THREAT	DESCRIPTION
Botnet (also zombies)	A collection of computers subject to control by an outside party, usually without the knowledge of the owners, using secretly installed software robots. The robots are spread by trojan horses and viruses. The botnets can be used to launch denial-of-service attacks and transmit spam.
Card skimming	The act of using a skimmer to illegally collect data from the magnetic stripe of a credit, debit or atm card. This information, copied onto another blank card's magnetic stripe, is then used by an identity thief to make purchases or withdraw cash in the name of the actual account holder. Skimming can take place at an atm and can occur at restaurants, taxis, or other places where a user surrenders his or her card to an employee.
Denial-of-service attack	Flooding the networks or servers of individuals or organizations with false data requests so they are unable to respond to requests from legitimate users.
Malicious code (also malware)	Any code that can be used to attack a computer by spreading viruses, crashing networks, gathering intelligence, corrupting data, distributing misinformation and interfering with normal operations.
Pharming	The act of sending an e-mail to a user falsely claiming to be an established legitimate enterprise to scam the user into surrendering private information that will be used for identity theft. The e-mail directs the user to visit a website where they are

Table 4.3.15-1: Methods of Cyberattacks (PA DHS, 2017)

THREAT	DESCRIPTION
	asked to update personal information, such as passwords and credit card, social security, and bank account numbers that the legitimate organization already has. The website, however, is bogus and set up only to steal the user's information.
Phishing	Using fake e-mail to trick individuals into revealing personal information, such as social security numbers, debit and credit card account numbers and passwords, for nefarious uses.
Spam	Unsolicited bulk e-mail that may contain malicious software. Spam is now said to account for around 81 percent of all e-mail traffic.
Spear phishing	A type of phishing attack that focuses on a single user or department within an organization, addressed from someone within the company in a position of trust and requesting information such as login ids and passwords. Spear phishing scams will often appear to be from a company's own human resources or technical support divisions and may ask employees to update their username and passwords. Once hackers get this data, they can gain entry into secured networks. Another type of spear phishing attack will ask users to click on a link, which deploys spyware that can thieve data.
Spoofing	Making a message or transaction appear to come from a source other than the originator.
Spyware	Software that collects information without a user`s knowledge and transfers it to a third party.
Trojan horse	A destructive program that masquerades as a benign application. Unlike viruses, trojan horses do not replicate themselves, but they can be just as destructive. One of the most insidious types of trojan horse is a program that claims to rid your computer of viruses but instead introduces viruses onto your computer.
Virus	A program designed to degrade service, cause inexplicable symptoms or damage networks.
Worm	Program or algorithm that replicates itself over a computer network and usually performs malicious actions, such as using up the computer's resources and possibly shutting the system down. A worm, unlike a virus, has the capability to travel without human action and does not need to be attached to another file or program.

Cyberattacks may not always constitute acts of cyberterrorism because some acts may have relatively small impacts and only produce annoyances. A cyberattack is generally considered an act of cyberterrorism when the following motivations are present:

- Effects-based: When computer attacks result in effects that are disruptive enough to generate fear comparable to a traditional act of terrorism.
- Intent-based: When unlawful or politically motivated computer attacks are done to intimidate or coerce a government or people to further a political objective, or to cause grave harm or severe economic damage (Rollins and Wilson, 2007).

Cyberattacks can be further divided into the following categories based on the complexity of the attack:

- Simple-Unstructured: Simple-unstructured attacks are the most common. These are amateurish attacks with relatively minimal consequences.
- Advanced-Structured: Advanced-structured attacks are more sophisticated and consequential and have a greater emphasis on targeting victims prior to an attack, resulting in a more debilitating effect.
- Complex-Coordinated: Complex-coordinated attacks are the most advanced and most troublesome type of attacks where success could mean a network shutdown (Denning, 2000).

Cyber terrorism can cause severe disruptions to transportation, public safety, and utility services, all of which are critical infrastructure that are highly dependent on information technology. Cyber terrorism can take many forms, including attacks through physical means, electronic means, and use of malicious code. Cyber terrorists can also have a wide range of personal, political, or cultural agendas. All state agencies, as well as individuals, businesses, and other institutions in Centre County, are potential targets for cyberterrorism. Potential threats include identity theft, loss of sensitive information, disruption of services, and other malicious activity.

Cyber terrorists can be difficult to identify because the internet provides a meeting place for individuals from various parts of the world. Individuals or groups planning a cyber-attack are not organized in a traditional manner, as they are able to effectively communicate over long distances without delay. Cyberattacks are also unpredictable and typically occur without warning.

4.3.15.2 Range of Magnitude

In recent years, cyber terrorism has become a significant threat and can impact people, businesses, institutions, local governments, and state agencies to varying degrees. Impacts from a large-scale cyberterrorism event could disrupt the state's economy and

potentially threaten its economic stability. The magnitude of a cyber terrorism attack will vary greatly based on the extent of systems affected and duration of the impact. Additionally, the magnitude will vary based upon which specific system is affected by an attack, the ability to preempt an attack, and an attack's effect on continuity of operations. The largest threat to institutions from cyber terrorism comes from any processes that are networked and controlled via computer. The county and individual municipalities should address and take measures to reduce any vulnerabilities that could allow access to sensitive data or processes. In addition, attacks on institutions or organizations outside of the county or even the state can impact residents, businesses, and government services.

The potential impacts of cyberterrorism on community lifelines are as follows:

Table 4.3.15-2: Most Likely Lifelines Impacted by Cyberterrorism

LIFELINES	NOTES
	Community safety may be threatened, and government services targeted by cyberterrorism activities.
	Energy infrastructure may be a target for cyberterrorism activities.
	Hazardous materials facilities and operations may be targets for cyber terrorists.

4.3.15.3 Past Occurrence

Penn State University guards against and repels cyber threats every day. In 2015, the University discovered cyberattacks to both the Colleges of Engineering and Liberal Arts (Penn State News, 2015). FireEye, a cybersecurity forensic unit with Mandiant, was hired for remediation. Remediation refers to post cyberattack assessments made to determine what parts of the network are infected and need fixing.

It was determined that these were sophisticated cyberattacks conducted with advanced malware. The attacks exposed thousands of passwords and other Personal Identification Information (PII). It was also determined that the earliest dates of intrusion were in 2012. The networks were taken offline for several days to find and remove malware. All students and faculty were asked to reset their passwords. There have been no significant attacks on the University in recent years.

Between 2012 and 2023, 24 cyberterrorism related incidents have been reported to PEMA-KC. Of these, 13 have occurred since 2021 (PEMA-KC, 2023). In 2017 there was an international cyber-attack, in 2018 there was a statewide cyber incident, and in 2021 a third-party vendor working with the PA Health Department on contact tracing compromised information on 72,000 people (Associated Press, 2021). Some of these events are described in more detail below.

A large-scale attack was the Equifax data breach in 2017, which was estimated to potentially impact over 5.5 million residents of Pennsylvania and over 145.5 million nationally. The information accessed included names, Social Security numbers, birthdates, addresses, and driver's license numbers (PA Office of the Attorney General, 2017). Additionally, in 2014 the largest data breach in history impacted over 3 billion Yahoo user accounts, including the names, email address, date of birth, and telephone numbers of over 500 million users (CSO, 2018). In terms of a data breach cyber-attack, this could be considered a worst-case scenario event. Large-scale data breach events are becoming more common.

In 2018, Centre County was subject to a series of cyberattacks. An attack in late August caused a disruption in service to systems under the county data network. Investigation by County's cybersecurity and IT network managing company identified encryption malware commonly known as ransomware. The variant was not found to have functionality to access of exfiltrate data, encrypt files, use encryption for financial gain, or take over command and control. The intent of this attack appeared to be the destruction of data. PII does not appear to have been accessed, viewed, or acquired. During the planning process, Bellefonte Borough noted that the community also experienced a cyberattack around this time that resulted in a two-week network shutdown.

In early September 2020, the County was subject to another attack. This ransomware attempted to encrypt data for financial gain, and successfully encrypted a series of files on the system. Investigations did not find evidence that any PII was accessed, viewed, or acquired in this incident. Following both County incidents, the County's cybersecurity partner implemented additional security measures, and worked with external experts to review the networks security (The Philadelphia Inquirer, 2021).

In July 2024, a faulty update issues by cybersecurity firm Crowdstrike led to an international incident when hospitals, airports, banks, and businesses experienced issues with internet connectivity and an inability to perform essential functions. Mount Nittany Health canceled nonemergency appointments for one day and two flights from State College regional Airport were canceled while others experienced delays (Rushton,

2024a). While not a cyberattack, this incident highlighted how incidents where the county or even state are not directly targeted can still result in impacts due to the connectedness of Information Technology (IT) systems.

In addition to large-scale acts of cyber terrorism, smaller cyberattacks occur daily. Billions of emails are sent each day, and spam and phishing emails account for a significant share of all email traffic. Additionally, brute force attacks, which are trial and error attempts to obtain user passwords and pins, are frequently used by criminals attempting to crack encrypted data or gain access to private accounts. Firewalls can be effective at keeping security threats such as these out, but once a cybercriminal gains access to a system, they can attack from within. For example, gaining access to a state employees email account would allow a hacker to send additional phishing emails from within a network, which may not be as monitored as closely as attacks from outside the system. This is known as spear phishing.

4.3.15.4 Future Occurrence

Cyber terrorism is an emerging hazard that has the potential to impact the County's computer infrastructure and the systems and services that are provided to the public. Concerns about cyberterrorism throughout the United States is growing as its impacts could have potentially crippling effects. Security experts describe the threat of cyberterrorism as imminent. The future occurrence of cyberterrorism can be considered *possible* as defined by the Risk Factor Methodology probability criteria (see Table 4.4.1-1).

Penn State University hosts several programs related to homeland security. Cybersecurity experts at this anchor institution could be an important partner for the County in both responding to and preventing cyberattacks. Centre County Information Technology Services website details mitigation tactics that individuals and business owners can take to prevent breaches in cybersecurity, including tips for creating passwords ways to stay safe in the workplace (Centre County, 2020b).

4.3.15.5 Vulnerability Assessment

Generally, cyber terrorism has no direct effect on the environment; however, the environment may be affected if a hazardous materials release occurred because of critical infrastructure failure as a result of cyber terrorism. Similarly, an act of cyber terrorism on a nuclear facility could have devastating environmental consequences if the plant suffered an intentional catastrophic failure. Please see Section 4.3.19 for more information on Hazardous Materials Release.

All county and municipal facilities are vulnerable to cyber terrorism. While the physical structures of these buildings are generally not at risk, information systems and data

stored within them are vulnerable. Government computer networks contain sensitive information that is integral to the security of the Commonwealth and could be the target of a cyberattack. County and municipal governments may also possess and maintain forms of personal and financial information, including tax filings, birth and death records, Social Security numbers, medical information, and more. Additionally, many critical facilities that are essential to Centre County operations are reliant upon computer networks to monitor and control critical functions. For example, an attack on internet access or the power grid could have detrimental impacts on County services and functions. Additionally, a large-scale computer breach could lead to economic costs in lost productivity to the impacted agency/organization and potentially related businesses and industries. However, lost revenues and productivity would depend on the type of magnitude of the cyber terrorism event.

All communities in Centre County are vulnerable on some level, directly or indirectly, to a cyber terrorism attack. However, in general, areas with higher concentrations of government or industry facilities may have higher risk. Additionally, areas with higher concentrations of people, businesses, and critical infrastructure may be at higher risk.

4.3.15.6 Equity in Vulnerable Communities

Households with those 65 or older may be more susceptible to cyber-attacks as older adults have lower levels of digital literacy compared to younger generations. This makes them more susceptible to scams, phishing, and other forms of cybercrime. This includes Rush Township, Philipsburg Borough, Patton Township, Potter Township, Centre Hall Borough, and Gregg Township. People in low-income or marginalized communities often have less access to education and resources on cybersecurity. The communities may not be able to afford the most up to date technology or cybersecurity tools, such as firewalls, antivirus, or secure home networks leaving them more exposed to cyber threats.

4.3.16 Dam Failure

The Dam Failure profile can be found in Appendix G.



4.3.17 Environmental Hazards – Coal Mining



4.3.17.1 Location and Extent

Mining, including surface, underground, and open-pit operations, has been an important economic activity in Pennsylvania since before the 1860s and was instrumental in the Commonwealth's development. Coal mining is the most prominent of Pennsylvania's mining activities and continues to be a major industry. Pennsylvania produces two types of coal: bituminous and anthracite. Bituminous coal is typically used for electricity generation and metal production. Anthracite coal, which is rarer than bituminous coal and can reach a high heating point that burns blue flame, is typically used for heating and metal production (PA DEP, 2024c).

While resources other than coal are also mined in Pennsylvania - including metal ores, clay and shale, and limestone - most of these deposits are of limited extent. Coal, in contrast, has been mined under large areas of the state. Counties underlain by coal deposits are at highest risk of environmental hazards resulting from coal mining activities. This area includes the majority of southwest Pennsylvania, situated over the Commonwealth's main bituminous field. Centre County's northwestern portion lies within the medium-volatile bituminous coal region.

Figure 4.3.17-1 shows the location of active and abandoned coal mining operations in Centre County. Note that the active and abandoned coal mines are primarily located on identified coal fields, however there are mines located outside the field areas.

Table 4.3.17-1 lists the number of active and abandoned coal mines in each municipality in Centre County. There are 91 active, 0 inactive, 20 abandoned, 0 proposed but never materialized, and 2 completed reclamation sites throughout the County, for a total of 112 coal mines. The highest concentration of total coal mines are located in Snow Shoe Township (50 sites) and Rush Township (48 sites). These municipalities also have the highest concentrations of active mines. The highest number of abandoned mines are located in Rush Township (12 mines) and Burnside Township (5 mines). There are 30 municipalities, listed below, that do not have any coal mines identified by the PA DEP; these are not included in Table 4.3.17-1:

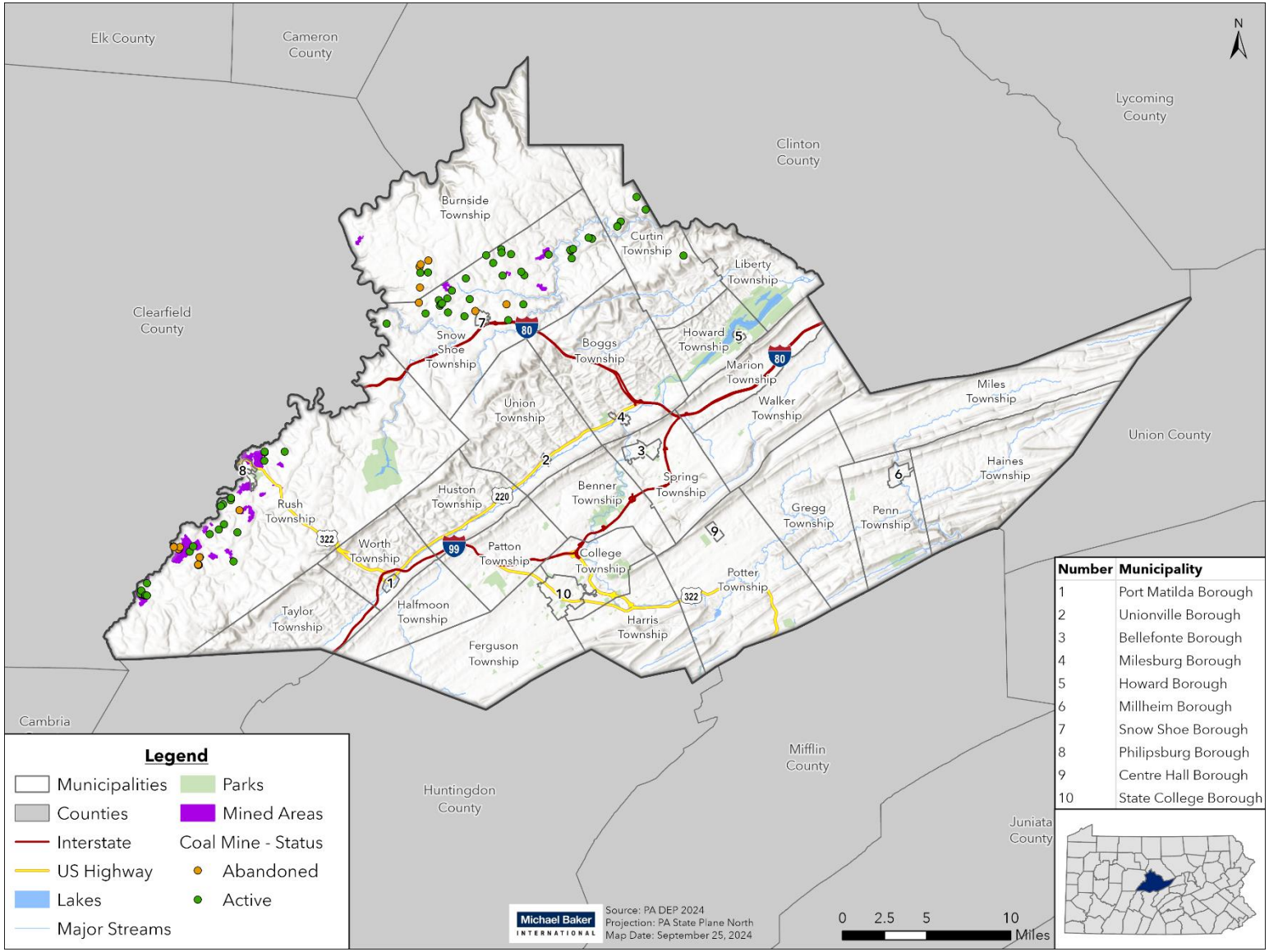
- Bellefonte Borough
- Benner Township
- Boggs Township
- Centre Hall Borough
- College Township
- Ferguson Township
- Gregg Township
- Haines Township

- Halfmoon Township
- Harris Township
- Howard Borough
- Howard Township
- Huston Township
- Liberty Township
- Marion Township
- Miles Township
- Milesburg Borough
- Millheim Borough
- Patton Township
- Penn Township
- Philipsburg Borough
- Port Matilda Borough
- Potter Township
- Snow Shoe Borough
- Spring Township
- State College Borough
- Taylor Township
- Union Township
- Unionville Borough
- Walker Township
- Worth Township

Table 4.3.17-1: Number of Mines by Type in Centre County Municipalities (PA DEP, 2024d)

MUNICIPALITY	NUMBER OF MINES					
	ABANDONED	ACTIVE	INACTIVE	PROPOSED BUT NEVER MATERIALIZED	RECLAMATION COMPLETED	TOTAL
Burnside Township	5	2	-	-	-	7
Curtin Township	-	7	-	-	-	7
Rush Township	12	35	-	-	1	48
Snow Shoe Township	3	47	-	-	-	50
Countywide Total	**20**	**91**	**-**	**-**	**1**	**112**

Figure 4.3.17-1: Active and Abandoned Coal Mines in Centre County



4.3.17.2 Range of Magnitude

Major impacts from mining include surface-elevation changes and subsidence, modification of vegetation, the chemical degradation and flow redistribution of surface water and groundwater, the creation of mine voids and entry openings, adverse aesthetic impacts, and changes in land use. In addition, active and abandoned mines can also result in injury and loss of human life. This can occur in active mines where workers are injured or killed by mine collapse, entrapment, poisonous gases, inundation, explosions, fires, equipment malfunction, and improper ventilation. Injuries and death, such as All-Terrain Vehicle (ATV) accidents, falling, and drowning, can also occur in abandoned mines.

The mineral-waste disposal from coal mining, also known as abandoned mine drainage (AMD), is also a hazard. Past disposal practices have dotted Pennsylvania's landscape with unsightly refuse piles. Many of the refuse piles contain combustible materials that cause long-term air-quality problems if ignited. Burning refuse piles have also been linked to major underground coal fires, such as those at Centralia and Shamokin in the Anthracite region of Pennsylvania. Reject wastes from coal mining that contain sulfide minerals can also degrade groundwater and surface water. Coal refuse piles have historically been prolific sources of abandoned mine drainage, which has impaired many streams in Pennsylvania. The environmental impacts of coal mining are many. Mining activities and abandoned mine drainage can contaminate surface and groundwater, create acid mine drainage, cause changes in water temperature, and damage to streams, lakes, ponds, estuaries, and wetland ecosystems. Mine explosions or burning refuse piles can cause air quality problems. Although mine reclamation is required for much surface mining activity, there is still a loss of quality in landscape, damage to vegetation, and degradation of habitat.

The potential impacts of coal mining on community lifelines are as follows:

Table 4.3.17-2: Most Likely Lifelines Impacted by Coal Mining

LIFELINES	NOTES
	Fire departments may be called into response and recovery if explosions or fires occur.
	Agricultural operations and water supplies may be affected through environmental contamination. There is also potential for land subsidence and structure collapse.
	Environmental contamination can have adverse health impacts on communities, leading to more strain on the local healthcare system.

Table 4.3.17-2: Most Likely Lifelines Impacted by Coal Mining

LIFELINES	NOTES
	Issues with mining operations may lead to additional challenges with energy production.

4.3.17.3 Past Occurrence

Although state and federal (U.S. Department of Labor, EPA, and the Office of Surface Mining and Reclamation) laws require occupational health, safety, and environmental protection in all mining activities, mining accidents still occur. The U.S. Department of Labor Mine Safety and Health Administration (MSHA) tracks mining accidents and injuries. Since 2014, there have been 19 deaths in Pennsylvania resulting from surface and underground coal mining activities. Although there have been many mining accidents in Pennsylvania's early mining history of the 1800's, there is no comprehensive database that tracks the data. Beyond operator accidents, there can be incidents that are a result of falls, drowning, electrocution, and ATV crashes (Mine Safety and Health Administration, 2024).

The DEP Bureau of Mine Safety is required by law to investigate all fatal and serious accidents that occur at underground Commonwealth mines. According to the Bureau, there have been four major mine emergencies in Pennsylvania coal mines. They define a mine emergency as a serious situation or occurrence that happens unexpectedly and demands immediate action or a condition of urgent need for action or assistance such as a state of emergency. Two of these were mine fires and two were inundations.

Side effects of previous mining operations are more easily tracked. In Centre County, the Moshannon Creek Watershed Association tracks the amount of harmful minerals within the water supply due to abandoned mine drainage. Minerals such as manganese, aluminum, and iron seep into the water supply and increase the pH of tributaries and streams. In Centre County, upper and mid-Moshannon tributaries are most often impacted with Browns run being the most impacted as of 2021 (Moshannon Creek Watershed Association, 2021).

4.3.17.4 Future Occurrence

It is difficult to forecast the severity and frequency of coal mining accidents and environmental damage in Centre County. Although throughout time, the government has strengthened mining and reclamation operation and environmental regulations, permitting, and inspection criteria, this has not prevented mining accidents and environmental damage from occurring. Surface subsidence resulting from underground mining continues to be a major concern of those impacted by the mining

industry. Despite the use of deep mine roof-support methods, some subsidence will eventually occur.

Surface subsidence resulting from underground mining continues to be a major concern of those impacted by the mining industry (see Section 4.3.10). Despite the use of deep mine roof support methods, some subsidence will eventually occur. It is likely that Pennsylvania will continue to modify its laws to reflect additional environmental awareness. Stricter controls on reclamation, perhaps specifically addressing the disposal of mining residuals, are likely. State and federal laws and programs have historically placed an emphasis on environmental preservation and reclamation. As in the past, it seems likely that Pennsylvania will be at the forefront of these programs and future occurrences will decrease.

Abandoned mine drainage is an additional concern for areas previously impacted by mining operations. The risk of AMD could result in the degradation of surface and groundwater quality, impacting both ecosystems and human health. Measures taken by state, federal, and nonprofit entities such as monitoring water quality, remediating contaminated sites, and implementing sustainable mining practices have worked to prevent further environmental harm. However, it is likely some water contamination will occur (EPA, 2024a).

Overall, the probability of future coal mining events is *possible* as defined by the Risk Factor Methodology (See Section 4.4.1-1).

4.3.17.5 Vulnerability Assessment

Table 4.3.17-3 shows the structures and critical facilities that are vulnerable to mining incidents. The table only includes municipalities that have coal mines Structures and critical facilities within a quarter mile of a mine operation are considered vulnerable. There are 2,898 structures in close proximity to coal mining operations countywide (3% of all structures). Municipalities that have the highest proportion of their structures close to mining operations include Snow Shoe Borough, Snow Shoe Township and Rush Township. Also, Snow Shoe Borough has 33% of their critical facilities in close proximity to coal mining operations, which is significantly higher than any other municipality. Table 4.3.17-4 shows structures prone to coal mining by land use. The most prone types of structures are residential.

Table 4.3.17-3: Structures and Critical Facilities Vulnerable to Coal Mines in Centre County

MUNICIPALITY	TOTAL STRUCTURES	STRUCTURES WITHIN .25 MILE OF COAL MINING OPERATION	PCT STRUCTURES WITHIN .25 MILE OF COAL MINING	TOTAL CFS WITHIN .25 MILE OF COAL MINING	CFS WITH .25 MILE OF COAL MINING OPERATION	PCT OF CFS WITHIN .25 MILE OF COAL MINING
Rush Township	4,587	1,212	26%	26	7	27%
Snow Shoe Borough	595	323	54%	3	1	33%
Snow Shoe Township	2,677	1,209	45%	6	1	17%
Spring Township	6,153	-	0%	30	-	0%
Countywide Total	**97,869**	**2,898**	**3%**	**439**	**9**	**2%**

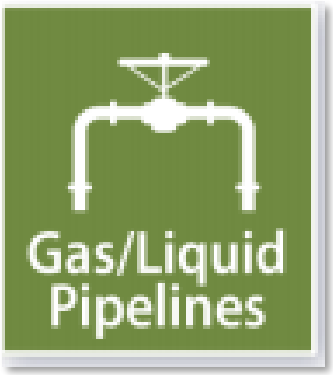
Table 4.3.17-4: Structure by Land Use Coal Mining Vulnerability in Centre County

MUNICIPALITY	STRUCTURES LOCATED IN COAL MINE PRONE AREAS															
	AGRICULTURE	COMMERCIAL	COMMS.	FORESTS	INDUSTRIAL	MINED LAND	MIXED USE	PUBLIC/SEMI-PUBLIC	RECLAIMED LAND	RECREATION	RESIDENTIAL	TRANSPORTATION	UTILITY	VACANT LAND	VACANT STRUCTURE	WATER	TOTAL
Burnside Township	14	5	-	9	-	1	1	-	5	-	109	-	1	2	-	-	147
Curtin Township	-	-	1	-	-	-	-	-	-	-	6	-	-	-	-	-	7
Rush Township	5	38	2	57	8	17	6	14	7	2	1,033	-	5	12	6	-	1,212
Snow Shoe Borough	1	12	1	1	-	-	9	13	1	2	278	-	1	1	3	-	323
Snow Shoe Township	55	35	2	66	9	12	4	15	4	4	989	-	5	8	-	1	1,209
Countywide Total	**75**	**90**	**6**	**133**	**17**	**30**	**20**	**42**	**17**	**8**	**2,415**		**12**	**23**	**9**	**1**	**2,898**

4.3.17.6 Equity in Vulnerable Communities

Communities near old and existing coal mines are at a higher risk for adverse impacts due to exposure to harmful pollutants, including coal dust, particulate matter, acid mine drainage, and contaminated water sources. These communities are often in rural areas which also are more likely to be dependent on well water. Mitigation efforts should focus on education and ensuring access to clean water. As shown in Table 3.3.17-5 the largest number of active mines within the County fall within Snowshoe Township, Rush Township, and Curtin Township. There is also a significant acreage of mined areas within Spring Township. For this reason, the rural communities in these mined areas should be at the forefront of mitigation and preparedness efforts related to coal mining.

4.3.18 Environmental Hazards – Gas and Liquid Pipelines



4.3.18.1 Location and Extent

Pipelines are a vital component of the nation's infrastructure that transport two of the materials most essential to daily life – water and energy products. This profile addresses the risks posed by the gas and liquid pipeline systems that move energy products in Pennsylvania and across Centre County. Pipeline systems are defined by federal regulations as all parts of a pipeline facility through which a hazardous liquid or gas moves, including piping, valves, pumps or compressors, metering and delivery stations, and storage and breakout tanks. Although pipelines are typically located underground, they may also be located aboveground when dictated by operational considerations (such as connections to pump and compressor stations) or environmental conditions (such as geological characteristics) (FEMA, 2015).

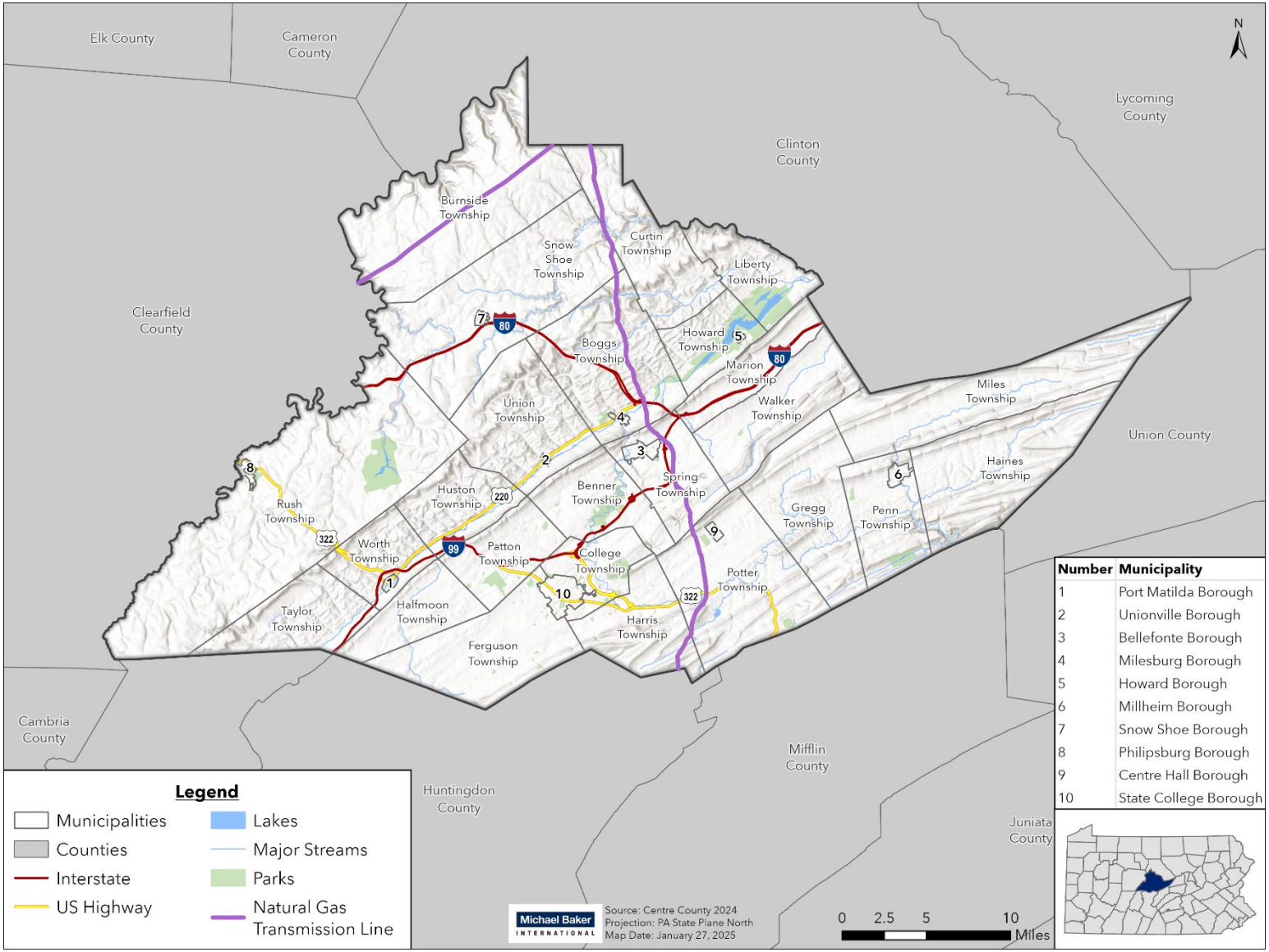
Natural gas pipelines are the most common type of pipeline in the United States and serve to transport natural gas from the point of production to the point of use. Three major types of pipelines move natural gas: gathering lines, transmission lines, and distribution lines. Gathering lines are the pipelines that move natural gas from the production well to a processing facility. Gas transmission lines are the large pipelines (6 to 48 inches in diameter) that move natural gas from the processing facility to local distribution networks. Gas transmission lines are designed to transport natural gas long distances at high pressures (often 200 – 1,500 psi). There are approximately 300,000 miles of gas transmission pipelines in the United States. Gas distribution lines are the smaller gas mains and service lines (1/2 to 2 inches in diameter) that move natural gas from the transmission network directly to homes and businesses. Gas distribution pipelines are designed to transport natural gas shorter distances at relatively low pressures. There are approximately 2.35 million miles of gas distribution lines in the United States (PHMSA, 2023).

Liquid petroleum pipelines are the second most common type of pipeline in the United States, and serve to transport crude oil, refined product, and highly volatile liquids (HVLs) to local distribution networks. For crude oil and its refined products, there are three major types of pipelines that move the product from producing areas to local distribution networks: gathering lines, transmission lines, and refined product lines. Gathering lines are the smaller pipelines (2 to 8 inches in diameter) that gather crude oil from production wells. Crude oil transmission lines are the larger, cross-country

pipelines (8 to 48 inches in diameter) that move crude oil from producing areas to refineries. There are approximately 84,000 miles of crude oil transmission pipelines in the United States. Refined product lines are the small to large lines (8 to 42 inches in diameter) that deliver refined petroleum products to storage terminals. There are approximately 64,000 miles of refined products pipelines in the United States (Pipelines 101, 2023). Tanker trucks take the refined petroleum products the last few miles from the storage terminals to gas stations and homes.

Figure 4.3.18-1 shows the pipelines that are located within Centre County. The pipeline runs directly through the middle of the county, and across the top of the county. There is 140 miles of natural gas transmission pipeline in Centre County (PEMA, 2023).

Figure 4.3.18-1: Gas and Liquid Pipelines within Centre County



4.3.18.2 Range of Magnitude

Many factors determine the magnitude of the hazard posed by pipeline failures, including the chemicals released, the failure mode of the pipeline, the operating conditions of the pipeline at the time of the incident, and the characteristics of the surrounding area. Impacts to life and property can result from inhalation or ingestion of toxins, exposure to a fire or explosion, or exposure to contaminated soils or drinking water (FEMA, 2015). These impacts may include:

- Serious injuries or fatalities;
- Damage to buildings and infrastructure;
- Disruptions and closures to critical infrastructure and services, including transportation routes and emergency medical services;
- Residential, commercial, and industrial energy supply losses;
- Disruption of local businesses and regional economies; and
- Displacement of residential communities or businesses.

Understanding pipeline threats and hazards begins with understanding the physical and chemical properties of the products in the pipeline. Natural gas is a clean-burning fuel that consists mostly of methane (94 percent) and ethane (2 percent). Some relevant characteristics of natural gas are summarized below:

- Although natural gas is nontoxic, it can cause asphyxiation if released in an enclosed area.
- Natural gas is combustible and natural gas fires produce large amounts of radiant heat.
- If an ignition source exists, natural gas releases can result in a sudden fire or explosion near the point of release. Once the release ends, however, the hazard declines very quickly as the gas disperses.
- If natural gas migrates into a building and accumulates inside, the hazard can persist for longer.

Liquid petroleum pipelines can carry many different crude oil and refined petroleum products with widely varying physical and chemical properties. Many of these products can spread over land and water, flowing into valleys, ravines, and waterways. Relevant characteristics of some liquid petroleum products are summarized below:

- Most crude oils are heavier and less toxic than refined petroleum products, and do not penetrate porous surfaces such as soil and sand. Because these products do not evaporate and tend to adhere to surfaces, however, they remain in the environment longer than refined products. Oil spills may take weeks, months, or even years to clean up.

- Most refined petroleum products are highly fluid, spready quickly over land or water surfaces, and penetrate porous surfaces. These products are usually flammable, and their volatile components can burn the eyes and skin and irritate the nose, eyes, and mouth. Because these products have a high evaporation rate and generally do not adhere to surfaces, they are easier to clean up. Refined petroleum products also produce vapors that are heavier than air. These vapors will collect in low areas.
- Highly volatile liquids are lighter than air and will form a vapor cloud when released to the atmosphere.
- Anhydrous ammonia is a highly volatile liquid that is particularly toxic and corrosive. It is typically transported under pressure as liquefied gas, and rapidly expands when released.

In some cases, natural hazard events can cause pipeline failures and/or complicate emergency response activities. When a pipeline failure occurs during a natural disaster, access to the pipeline may be restricted, waterlines for fire suppression may be compromised, and response personnel and resources may be limited. In addition, the potential threat of a pipeline failure can be amplified by natural hazard events that are accompanied by winds, thunderstorms, or floods. These conditions can spread contamination more quickly and exacerbate the threat to local water supplies, air quality, soil, and agriculture. Other natural hazard events that can lead to pipeline failure include earthquakes, land subsidence, avalanches, lightning, fires, and severe winter storms (FEMA, 1997).

Several exacerbating or mitigating circumstances can affect the severity of a pipeline failure. Mitigating circumstances include precautionary measures taken in advance to reduce the impact of a release on the surrounding environment. After a release, primary and secondary containment or shielding by sheltering-in-place can help protect people and property. Exacerbating circumstances can include weather conditions, the micro-meteorological effects of buildings and terrain, and lack of code compliance or maintenance. Non-compliance with applicable codes (e.g. building or fire codes) and maintenance failures (e.g. fire protection and containment features) can substantially increase the damage to pipelines and surrounding buildings.

The potential impacts of coal mining on community lifelines are as follows:

Table 4.3.18-1: Most Likely Lifelines Impacted by Pipelines

CLIFELINES	NOTES
	Fire departments may be called into response and recovery if leaks or other issues result in explosions and fires.
	Environmental contamination from pipelines can impact agricultural operations and water supplies. Supply chains may also be impacted if there are disruptions to transportation infrastructure.
	Environmental impacts from pipelines could adversely impact communities, leading to more strain on the local healthcare system.
	Pipelines play an important role in energy production and distribution. Issues with pipelines may lead to additional challenges with energy production and availability.

4.3.18.3 Past Occurrence

Pennsylvania has a long history of oil and gas well drilling and transportation and, though relatively infrequent, many accidents and incidents have occurred related to the extraction and transportation of these natural resources. No comprehensive list of oil and gas related incidents exist at the county level. The hazards associated with each incident vary widely and encompass damages including serious injury, explosion, fire, and water contamination.

Other prior year incident information for Pennsylvania can be found on the Pennsylvania Emergency Management Association website. The Pennsylvania Hazardous Material Emergency Planning and Response Act 1990-165 2021 Annual Report, the most recent version available, states there were no releases in Centre County.

There have been no reported pipeline failures within Centre County to date.

4.3.18.4 Future Occurrence

While many pipeline break incidents have occurred in Pennsylvania in the past, they are generally considered difficult to predict, especially within the boundaries of a county. An occurrence is largely dependent upon the accidental or intentional actions of a person or group. It is difficult to predict when and where environmental hazards related to gas pipelines will arise as they are often related to equipment failure and human error. Adequate monitoring through the DEP will reduce the likelihood of potential

impacts to the community and to the environment. Overall, the probability of future environmental hazards events is *possible* as defined by the Risk Factor Methodology (See Section 4.4.1-1).

Pipeline failures are low-probability, potentially high-consequence events. Although gas and liquid pipeline failures are infrequent, the hazardous and inflammable materials released by these events can pose a significant threat to public safety and the built and natural environment. Explosions associated with pipeline failures, for example, can cause severe injury to nearby residents and destroy homes and other property. Corrosion is a major cause of pipeline failure, and is often associated with pipeline age (FEMA, 2015). Besides corrosion, pipeline failures can be caused by external impacts from farm or construction machinery, structural failures, mechanical defects, and natural hazards. Land development tends to increase the likelihood of external impacts and pipeline failure. Gas and liquid pipeline data and information is often difficult to share given the sensitivity and information sharing protections. This limits analysis that can be conducted for proposed and existing developments, community vulnerabilities and impact points. Land development without appropriate planning can also impede access to pipelines for operation and maintenance or emergency response.

4.3.18.5 Vulnerability Assessment

Table 4.3.18-2 lists the total structures and critical facilities vulnerable to a liquid or gas pipeline incident (excluding oil and gas wells). The table only includes municipalities with pipelines. The jurisdictions with the most structures located within 0.25 miles of a liquid or gas are Spring Township (1,126 structures), Potter Township (663 structures), and Boggs Township (454 structures). The communities with the highest percent of total structures within 0.25 miles of a liquid or gas pipeline Spring Township (18% of total structures). The jurisdictions that have the most critical facilities within 0.25 miles of a liquid or gas pipeline are Spring Township (6) and Boggs Township (3). The jurisdictions with the highest percentage of total critical facilities within 0.25 miles of a liquid or gas pipeline are Boggs Township (38% of total critical facilities) and Spring Township (20% of total critical facilities). Table 4.3.18-3 lists the vulnerability of each municipality to liquid and gas pipelines generalized by land use. There are in total 2,604 total structures located within 0.25 miles of a liquid or gas pipeline; the most vulnerable structure to the hazard is residential with 1,839 structures located near a pipeline.

Table 4.3.18-2: Structures and Critical Facilities Vulnerable Liquid and Gas Pipelines

MUNICIPALITY	TOTAL STRUCTURES	STRUCTURES WITHIN .25 MILES OF A LIQUID OR GAS PIPELINE	PERCENT STRUCTURES WITHIN .25 MILES OF A LIQUID OR GAS PIPELINE	TOTAL CRITICAL FACILITIES	CRITICAL FACILITIES WITHIN .25 MILES OF A LIQUID OR GAS PIPELINE	PERCENT CRITICAL FACILITIES WITHIN .25 MILES OF A LIQUID OR GAS
Bellefonte Borough	3,608	187	5%	21	-	0%
Boggs Township	3,300	454	14%	8	3	38%
Burnside Township	753	105	14%	3	-	0%
Curtin Township	1,055	43	4%	2	-	0%
Harris Township	3,803	10	0%	11	-	0%
Potter Township	4,648	663	14%	15	1	7%
Snow Shoe Township	2,677	16	1%	6	-	0%
Spring Township	6,153	1,126	18%	30	6	20%
Countywide Total	**97,869**	**2,604**	**3%**	**439**	**10**	**2%**

Table 4.3.18-3: Structures Vulnerable to Liquid and Gas Pipelines by Generalized Land Use Type

MUNICIPALITY TOTAL STRUCTURES	STRUCTURES LOCATED IN LANDSLIDE-PRONE AREAS																
	AGRICULTURE	COMMERCIAL	COMMS.	FORESTS	INDUSTRIAL	MINED LAND	MIXED USE	PUBLIC/SEMI-PUBLIC	RECLAIMED LAND	RECREATION	RESIDENTIAL	TRANSPORTATION	UTILITY	VACANT LAND	VACANT STRUCTURE	WATER	TOTAL
Bellefonte Borough	-	-	-	-	-	-	-	-	-	-	186	-	-	1	-	-	187
Boggs Township	74	35	-	14	10	-	-	2	-	1	301	2	15	-	-	-	454
Burnside Township	1	-	-	4	-	4	-	1	-	-	90	-	3	1	-	-	105
Curtin Township	-	-	-	3	-	-	-	-	-	-	33	-	6	-	-	-	43
Harris Township	-	-	-	-	-	-	-	-	-	-	10	-	-	-	-	-	10
Potter Township	144	51	1	19			11	2	-	6	423	-	-	6	-	-	663
Snow Shoe Township						9			-	-	5	-	2		-	-	16
Spring Township	134	71	10	22	8	17	16	11	-	-	791	2	17	25	2	-	1,126
Countywide Total	**353**	**157**	**11**	**62**	**18**	**30**	**27**	**16**	**-**	**7**	**1,839**	**4**	**43**	**33**	**2**	**-**	**2,604**

4.3.18.6 Equity in Vulnerable Communities

Equity considerations in gas and liquid pipelines emphasize ensuring that mitigation and preparedness actions address the unique needs of vulnerable populations. Communities near pipelines are at higher risk of leaks, spills, or explosions, yet they may lack the resources or infrastructure needed for effective emergency response. Pipelines are often in or near low-income and minority communities, indigenous lands, and rural areas. Pipelines also are oftentimes located in existing industrial areas, compounding potential impacts. Health impacts associated with pipelines include respiratory illnesses, cancers, and neurological areas. Those with pre-existing health conditions or older homes may be more at risk due to associated contaminated air or water. Penn Township, Milheim Borough, Haines Township, Miles Township, Marion Township, and Walker Township have the highest concentration of people without health insurance. Preparedness efforts must include accessible emergency response plans, clear communication in multiple languages, and training programs tailored to local communities. Additionally, prioritizing regular maintenance, with a focus on areas where vulnerable populations live, is essential to mitigate harmful effects.

4.3.19 Environmental Hazards – Hazardous Material Release



4.3.19.1 Location and Extent

Hazardous material releases pose threats to the natural environment, the built environment, and public safety through the diffusion of harmful substances, materials, or products. Hazardous materials can include toxic chemicals, infectious substances, bio-hazardous waste, and any materials that are explosive, corrosive, flammable, or radioactive. Hazardous material releases can occur wherever hazardous materials are manufactured, used, stored, or transported. Such releases can occur along transportation routes or at fixed-site facilities. Hazardous material releases can result in human and wildlife injury, property damage, and contamination of air, water, and soils.

Fixed-site facilities that use, manufacture, or store hazardous materials in Centre County pose significant risk and must comply with both Title III of the federal Superfund Amendments and Reauthorization Act (SARA), also known as the Emergency Planning and Community Right-to-Know Act, and the Commonwealth's reporting requirements under the Hazardous Materials Emergency Planning and Response Act (1990-165), as amended. These statutes require that all owners or operators of facilities that manufacture, produce, use, import, export, store, supply, or distribute any extremely hazardous substance, as defined by the EPA, at or above the threshold planning quantity, shall report to the county where the facility is located and the Commonwealth. These facilities are subject to the requirement of assisting the Local Emergency Planning Committee (LEPC) in the development of an Off-site Emergency Response Plan (UA EPA, 2020a). The right-to-know reporting requirements keep communities abreast of the presence and release of chemicals at individual facilities. The EPA also tracks key information about chemicals handled by industrial facilities through its Toxics Release Inventory (TRI) database. Facilities which employ ten or more full-time employees, and which manufacture or process 25,000 pounds or more, or otherwise use 10,000 pounds or more, of any SARA Section 313-listed toxic chemical in the course of a calendar year are required to report TRI information to the EPA and PEMA. In 2023, there were 1,047 tracked facilities on EPA's TRI in Pennsylvania, 8 of which are located in Centre County as shown in Figure 4.3.19-1. This marks a decrease of 18 facilities since the last plan update (EPA, 2024b).

Figure 4.3.19-1: Locations Toxic Release Inventory (TRI) Facilities in Centre County, 2024

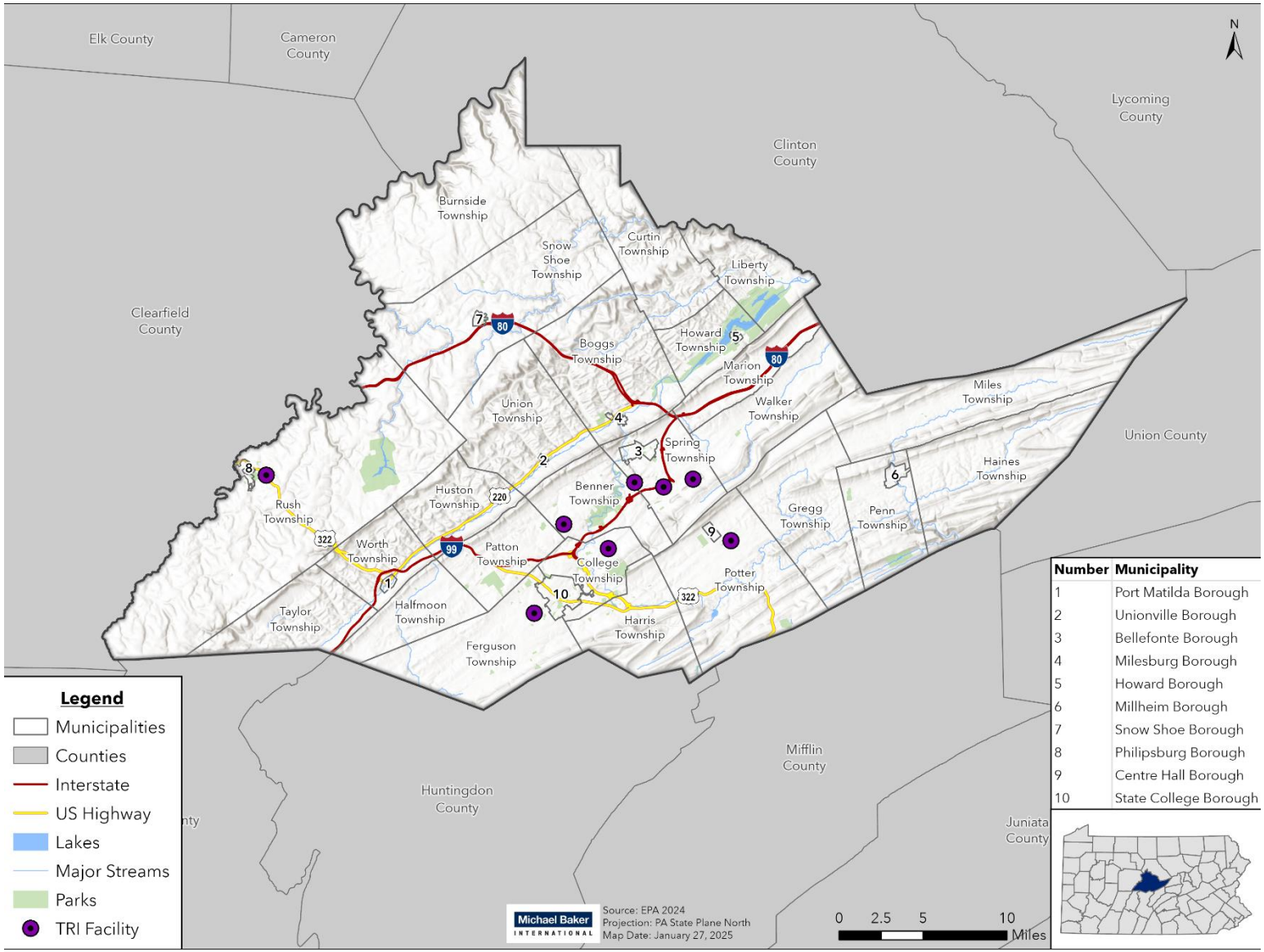


Table 4.3.19-1 shows the number of TRI facilities in Centre County by municipality. Of the 35 municipalities in Centre County, 7 contain a TRI facility. Spring Township is home to the most TRI sites in the County, the only one with multiple.

Table 4.3.19-1: TRI Facilities in Centre County

TRI FACILITY	ADDRESS	MUNICIPALITY
State of the Art/State College PLT	2470 Fox Hill Road	Benner Township
TRS Technologies	2820 East College Avenue	College Township
Spectrum Control Technology Inc.	1900 West College Avenue	Ferguson Township
Hanover Foods Corp.	Route 45	Potter Township
PMG Pennsylvania Corp.	187 Enterprise Drive	Rush Township
Supleco/Bellefonte PLT	595 North Harrison Road	Spring Township
Piezo Kinetics	660 Rolling Ridge Drive	Spring Township
Graymont (PA) Inc.	375 Graymont Road	Patton Township

Due to the sensitive nature of SARA facility information, Centre County will not provide a detailed account of SARA facilities for this plan. This information may be requested in writing to the Centre County LEPC Chairman, 420 Holmes Street, Bellefonte, PA 16823. However, a notable facility that reports through the EPA TRI process includes. Piezo Kinetics in Spring Township. The facility manufactures piezoelectric ceramic elements that are used by the aerospace and biomedical industries and in items such as sound boards, dental equipment, and even fish finders. In 2022, this company was responsible for 42 percent of Centre County releases. Piezo Kinetics had no on-site toxic releases but used a solidification or stabilization process to capture 10,794 pounds of lead compounds and send them off-site (EPA, 2024b).

In addition to fixed-site hazardous materials release, there are increasingly large numbers of chemicals, oils, radioactive materials, and other hazardous substances spilled as a result of highway, rail, and waterway accidents, storage tank leakage, pipeline break, and/or other accidents. On occasion, these events become a major disaster and force people to evacuate and/or lose their homes and businesses. According to the U.S. DOT's Office of Operations and the U.S. Census Bureau, it is estimated that 11 percent of all freight transported by trucks is hazardous material.
A number of major highways can be used in Centre County for the transport of hazardous materials including I-80, I-99, US-220, US-322, PA-26, PA-144, PA-164, and PA-550. Centre County has 586.28 linear miles of roadway according to PennDOT's 2023 Pennsylvania Highway Statistics Report (PennDOT, 2024b). Additionally, many of these roads cross rivers and streams and travel through downtown and residential areas, increasing the potential to pollute surface water and groundwater and cause harm to life and property.

PA-26, 64, 144, and 550 are also vulnerable to accidents involving hazardous materials. As hazardous materials shipments on these roadways continue to increase, it is not only likely transportation incidents involving hazardous materials will continue to occur in Centre County; they could increase in number and magnitude.

The risk of transportation-related hazardous material incidents is also heightened by the installation of high-speed rails through Bald Eagle Valley, increasing air traffic over Centre County, and expansion of University Park Airport. Several railroad accidents have occurred in Pennsylvania involving hazardous materials (NTSB, 2020), though none in Centre County. Potential also exists for hazardous material release incidents to occur along pipelines. Large spills can result from collisions or derailments of train cars. Pipelines that transport hazardous liquids and flammable substances can corrode, be damaged during excavation, incorrectly operated, or damaged by other natural or human-made forces leading to a hazardous materials release incident. Additional hazardous materials are contained at the military installations within Pennsylvania. Nuclear facilities are another type of fixed-facility that poses risk of hazard material release. For more information about nuclear incidents, reference Section 4.3.22.

4.3.19.2 Range of Magnitude

Hazardous material releases can contaminate air, water, and soils, possibly resulting in death and/or injuries. Dispersion can take place rapidly when transported by water and wind. While often accidental, releases can occur as a result of human carelessness, intentional acts, or natural hazards. When caused by natural hazards, these incidents are known as secondary events. Hazardous materials can include toxic chemicals, radioactive materials, infectious substances, and hazardous wastes. Such releases can affect nearby populations and contaminate critical or sensitive environmental areas.

With a hazardous material release, whether accidental or intentional, there are several potentially exacerbating or mitigating circumstances that will affect its severity or impact. Mitigating conditions are precautionary measures taken in advance to reduce the impact of a release on the surrounding environment. Primary and secondary containment or shielding by sheltering-in-place protects people and property from the harmful effects of a hazardous material release. Exacerbating conditions, characteristics that can enhance or magnify the effects of a hazardous material release include:

- Weather conditions: Affects how the hazard occurs and develops.
- Micro-meteorological effects of buildings and terrain: Alters dispersion of hazardous materials.
- Non-compliance with applicable codes (e.g. building or fire codes) and maintenance failures (e.g. fire protection and containment features): Can

substantially increase the damage to the facility itself and to surrounding buildings.

The severity of the incident is dependent not only on the circumstances described above, but also with the type of material released and the distance and related response time for emergency response teams. The areas within closest proximity to the releases are generally at greatest risk, yet depending on the agent, a release can travel great distances or remain present in the environment for a long period of time (e.g. centuries to millennia for radioactive materials), resulting in extensive impacts on people and the environment.

A worst-case scenario event of a hazardous material release would be if a release occurred in the most populous jurisdiction, State College Borough. A hazardous material release would likely cause the evacuation of residents and the students and staff of Penn State University.

The environmental impacts of hazardous material releases include:

- Hydrologic effects – surface and groundwater contamination.
- Other effects on water quality such as changes in water temperature.
- Damage to streams, lakes, ponds, estuaries, and wetland ecosystems.
- Air quality effects – pollutants, smoke, and dust.
- Loss of quality in landscape.
- Reduced soil quality.
- Damage to plant communities – loss of biodiversity; damage to vegetation.

Damage to animal species – animal fatalities; degradation of wildlife and aquatic habitat; pollution of drinking water for wildlife; loss of biodiversity; disease.

The potential impacts of hazardous materials release on community lifelines are as follows:

Table 4.3.19-2: Most Likely Lifelines Impacted by Hazardous Materials Release

Lifelines	Notes
	Fire departments may be called into response and recovery if leaks or other issues result in explosions and fires.
	Impacts from hazardous materials releases include environmental contamination, which can impact agricultural operations and water supplies.

Table 4.3.19-2: Most Likely Lifelines Impacted by Hazardous Materials Release

Lifelines	Notes
	Releases can have adverse impacts on communities, leading to more strain on the local healthcare system.
	Transportation lifeline as release itself or resulting explosions and fires.

4.3.19.3 Past Occurrence

The County's first large-scale, multi-municipality hazardous material response was to a multiple vehicle accident on I-80 on January 6, 2004. This accident occurred when a sudden snow squall caused the roadway to flash freeze and created whiteout conditions. A total of 47 vehicles, 30 of which were tractor trailers, crashed, killing six and injuring at least 11 people who required emergency medical transport. One tractor trailer, located at the center of the accident, was carrying 80 drums of hazardous waste. The situation was further complicated by frigid temperatures. A total of 84 emergency response agencies from Centre County and seven other counties responded.

Between January 2021 and October 2024, there were 23 highway and railway related hazardous material incidents in Centre County (PHMSA, 2024). Table Other prior year incident information for Pennsylvania can be found on the U.S. Department of Transportation Pipeline and Hazardous Materials Safety Administration website.

Since the passage of SARA, Title III facilities which produce, use, or store hazardous chemicals must notify the public through the county emergency dispatch center and PEMA if an accidental release of a hazardous substance meets or exceeds a designated reportable quantity, and affects or has the potential to affect persons and/or the environment outside the plant. SARA Title III and Pennsylvania Act 165 also require a written follow-up report to PEMA and the County. These written follow-up reports include any known or anticipated health risks associated with the release and actions to be taken to mitigate potential future incidents. In addition, Section 204(a) (10) of Act 165 requires PEMA to staff and operate a 24-hour State Emergency Operations Center (SEOC) to provide effective emergency response coordination. The Pennsylvania's Hazardous Material Emergency Planning and Response Act 990-165 - 2021 Annual Report is the latest report available. It states there were 1,643 hazardous materials/petroleum incidents in Pennsylvania and five of these events occurred in Centre County (PEMA, 2021). Additional incident information for years prior to 2021 may be obtained from annual reports submitted to PEMA.

Since beginning in January 1989, 194 hazardous material release events were identified in Centre County OES's incident log. While this is not a comprehensive source of all incidents in Centre County, it provides an inventory of events with which OES has been involved. Table 4.3.18-3 shows a detailed summary of events recorded in the past 10 years, since 2014. The largest recent hazardous material release occurred in October 2020, when a crew in Bellefonte Borough struck an unmarked natural gas line. This resulted in the evacuation of residents and closure of businesses within a one-mile radius of the leak. This included the Centre County Courthouse, Annex, and Sheriff's Office. Evacuations were assisted by multiple law enforcement agencies and fire companies. The leak was reported at 11:20 AM and the evacuation was lifted at 1:00 PM. Table 4.3.18-4 shows the number of hazardous materials release events in the Centre County OES log by year since1989. As shown, reported incidents spiked during 1995-1997.

Table 4.3.19-3: Hazardous Materials Releases in Centre County OES Incident Log (Centre County EMA, 2024)

DATE	TYPE	INCIDENT	LOCATION
5/19/2014	Hazmat	Pesticide Spill	Rte. 322, Potters Mills, Potter Twp.
4/19/2015	Hazmat	Chemical Spill	Millennial Science Complex Off Pollock Rd, State College Boro
5/10/2015	Hazmat	Ammonia Release	Hanover Foods, Potter Twp
2/22/2015	Hazmat	Chemical Spill	Millennial Science Complex off Pollock Rd, State College Borough
4/19/2015	Hazmat	Ammonia Release	Hanover Foods, Potter Township
7/14/2015	Hazmat	Chemical Spill	1009 Taylor St., State College Borough
7/31/2015	Hazmat	Hazmat Tanker Fire	T & A Truck Stop, Boggs Twp.
9/9/2015	Gas leak	Ruptured Gas Line	College Ave. Pleasant Gap, Spring Township
6/16/2016	Hazmat	Tractor Trailer Fuel Leak	Milesburg McDonald's, Boggs Township
3/3/2017	Hazmat	Mercury from Thermometer	450 Robinson Lane, Benner Township
3/3/2017	Hazmat	Hydraulic Fluid Spill	Rte 64 & Fiedler Rd, Spring Township

Table 4.3.19-3: Hazardous Materials Releases in Centre County OES Incident Log (Centre County EMA, 2024)

DATE	TYPE	INCIDENT	LOCATION
5/28/2017	Hazmat	CHLORINE LEAK (Hypochlorite Solution-5% Chlorine)	Kepler Pool, Governors' Park Rd, Spring Township
3/13/2018	Hazmat	Residential Heating Oil Spill, Small Quantity	Mt. Eagle, Howard Township
8/31/2018	Hazmat	Report of Oil Sheen, In Flood Waters, NRC#1224205	Port Matilda Boro Intersection
3/11/2019	Hazmat	Came Through NRC, Reported Release of Ammonia	Hanover Foods, Sr 45, Potter Township
6/12/2019	Hazmat	Heating Oil Spill, Contained to Basement	102 Fountain Road, Snow Shoe Township
6/18/2019	Hazmat	Fuel Oil Spill, 100 Plus Gallons	Sr 350, Presque Isle St. Philipsburg Borough
7/24/2019	Hazmat	Propane Release from Amerigas	Amerigas, Axeman, Sr 144, Spring Township
1/24/2020	Hazmat/ Sheltering	Natural Gas Leak, Residents Evacuated	Park Avenue, Spring Township
4/29/2020	Hazmat	Suspected medical waste dumped	SR 45, Potter Township
8/1/2020	Hazmat – Gas release	Vehicle struck three 200 lb. propane tanks	Village of Boalsburg, Harris Township
8/18/2020	Hazmat	Home heating oil tank leak	Fowler Hollow Road, Taylor Township
9/27/2020	Hazmat	Fuel leak from boat into lake	Marina, Bald Eagle State Park
10/16/2020	Hazmat – Gas release	Major gas line struck, entire town evacuated	Bellefonte Borough
11/22/2020	Hazmat – Gas release	Unknown source – possibly release from outside	E. Mountain Road, Worth Township
12/11/2020	Hazmat – Gas release	Leak at Hawbakers Tank Farm	Pleasant Gap, Spring Township
01/29/21	Transportation	TT hit debris, leaked 50-100 gallons fuel	1-99 NB, Spring Twp.
3/23/2021	Transportation	Gas Tanker crash, spill, both Hazmat teams	SR 332 at POTTER/ HARRIS line
11/9/2021	Hazmat - Leak	150 lb. propane bottle leaking	Church St. Port Matilda Boro

Table 4.3.19-3: Hazardous Materials Releases in Centre County OES Incident Log (Centre County EMA, 2024)

DATE	TYPE	INCIDENT	LOCATION
12/02/21	Transportation	TT rollover, fuel leak, extrication	1-80, East, MM 170, Marion Twp.
12/06/21	Transportation	TT vs PC, fatal, fuel leak, closure	SR 322, Harris Twp.
03/26/22	Poisonous Gas	HIGH CO, Evacuations, cause-blasting	Construction site, Amberleigh, Benner Twp.
04/05/22	Gas Leak	Supply line struck, Columbia gas	Gemar Ave. Spring Twp.
04/13/22	Heating Oil Leak	Outside tank leaking, response, clean up	112 Railroad St. Milesburg Borough
05/14/22	Transportation	TT Rollover, Fuel Leak,closure	SR 322, Worth Twp.
09/07/22	Transportation	TT into Median, Fuel leak, 75 gallons	1-99, MM 65.2 NB, Worthh Twp.
12/16/2022	Hazardous Materials	Reported by Cura Emergency Service - 40 gallons gasoline spill from vehicle at Travel Centers of America. Spilled onto the ground	8075 North Eagle Valley Rd, Milesburg Borough
2/1/2023	Hazardous Materials	Person sick unknown if caused by hazardous	Steidle Building, University Park Campus
02/20/23	Hazardous Conditions	Oil tank leaking	177 Peppermint Lane, Huston Township
8/9/2023	Hazardous Materials	Chlorine leak in the pool area	White Building, University Park Campus,
8/14/2023	Hazardous Materials	Small gasoline spill at the pumps. No hazmat	170 Buckaroo Lane, Spring Township
01/29/24	Hazmat – Gas Release	2" gas line struck with active leak	304 Fry Dr, State College Borough
4/26/2024	Hazardous Materials	During a hazardous waste collection, a crystalized bottle of diethyl either and another of sulfuric acid had to be destroyed by the bomb team. The Refuse Authority closed.	Centre County Recycling and Refuse Authority, 253 Transfer Rd, College Township
5/31/2024	Hazardous Materials	Centre received an alert on a garbage truck. Assistance	Centre County Recycling and Refuse Authority, 253

Table 4.3.19-3: Hazardous Materials Releases in Centre County OES Incident Log (Centre County EMA, 2024)

DATE	TYPE	INCIDENT	LOCATION
		needed to determine the source.	Transfer Rd, College Township
6/23/2024	Hazardous Materials	Fuel leaked from DCNR boat. There is a slight sheen on the water. They deployed.	Black Moshannon State Park, Boat Launch, 645 Westside Rd, Rush Township

Table 4.3.19-4: Hazardous Materials Release Events in Centre County (Centre County EMA, 2024)

YEAR	EVENTS	YEAR	EVENTS
1989	5	2007	3
1990	7	2008	5
1991	6	2009	7
1992	4	2010	2
1993	8	2011	4
1994	7	2012	3
1995	13	2013	0
1996	12	2014	1
1997	17	2015	7
1998	4	2016	1
1999	5	2017	3
2000	3	2018	2
2001	8	2019	4
2002	8	2020	7
2003	4	2021	5
2004	6	2022	6
2005	4	2023	4
2006	5	2024	4
Total		**194**	

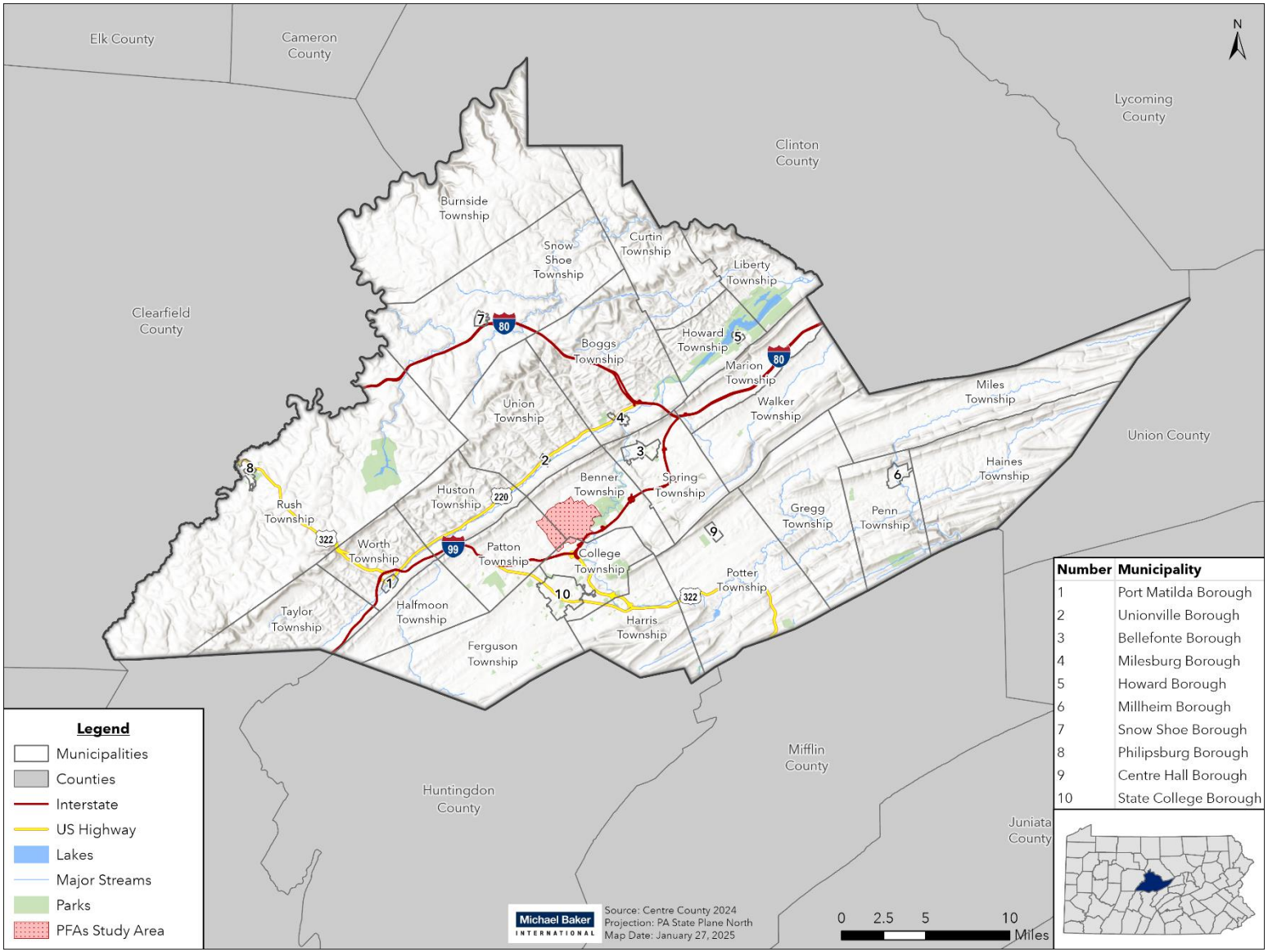
There are additional concerns in Centre County related to sulfuric acid runoff from the Skytop highway cut through Bald Eagle Mountain (Township of Patton), which was created during I-99 construction in 2003. The exposure of large quantities of Iron Pyrite have resulted in a reaction with the iron sulfide present in the mineral and outside oxygen which in turn produces sulfuric acid and is damaging when this acid is present in appreciable quantities, mixes with rainwater and washes into the local watershed and

drainage system. During construction of I-99, more than a million cubic yards of acid rock (the term being used for rock piles composed significantly of pyrite), which had been safely embedded in geologic formations for millions of years, have been dug up and exposed. The resulting acid has leaked primarily into Buffalo Run, an official "high quality" stream that runs through the valley immediately to the east of Bald Eagle Ridge, and eventually to Spring Creek and the West Branch of the Susquehanna River. Ultimately, a remediation effort (2006-2008) was undertaken to transfer and encase such rock currently held in an Engineered Rock Placement Area alongside Interstate 99 a mile east of Port Matilda. The DEP since characterized the quality of groundwater in the Skytop area as stable, but it has been noted that a slight increase in sulfates in some home wells has been detected (2009), generally around the crossroads of North Atherton Street and state Route 550, downhill from Skytop.

In 2019, sampling data from public wells in Benner Township prompted further investigation from DEP regarding per- and poly-fluoroalkyl substance (PFAS) compounds. Pennsylvania's PFAS Action Team published a report that the groundwater near High Tech Road was contaminated with PFAS and recommended further investigation. In accordance with the Hazardous Site Cleanup Act (HSCA), DEP's Bureau of Environmental Cleanup and Brownfields has been investigating to understand the extent of the contamination and identify pathways to exposure for residents. The investigation also aims to locate the source of the contamination and develop mitigation and remediation strategies.

As of the summer of 2024, DEP has collected well over 100 samples from wells and soil in the area. The investigation area can be found in Figure 4.3.19-2:. The results of testing have led to homes being provided with bottled water as an interim drinking source and the DEP-funded installation of 26 Point of Entry Treatment Systems (POETs) in homes. These POETs are tested to determine their impact on PFAS levels, with a May 2024 report stating the systems have been effective. DEP is currently investigating a public water line extension as a final remedy for contamination. The May 2024 report recommended DEP continue to monitor and test groundwater and soil in the area to identify additional contaminated wells and eventually a source of the contamination. (HDR Engineering, 2024). After the discovery of contamination at the Penn State University Airport in Benner Township and further testing, the university has agreed to pay $564,000 toward the investigation and cleanup costs. The contamination was determined to be caused by federally mandated firefighting foam used at the airport. In the future, Penn State will test wells, provide bottled water, and maintain treatment systems for areas affected by airport contamination (Massey, 2024).

Figure 4.3.19-2: PFAS Study Area in Centre County (2024)



4.3.19.4 Future Occurrence

While many hazardous material release incidents have occurred in Centre County in the past, they are generally considered difficult to predict. An occurrence is largely dependent upon the accidental or intentional actions of a person or group. Intentional acts are addressed under Section 4.3.24, Terrorism.

Shifting traffic patterns and the presence of a multitude of hazardous materials in transit through the county, however, still warrants the need for continued development of response capability, which has been an ongoing priority for the Centre County OES, the Centre County Local Emergency Planning Committee and the County's fire, hazmat, EMS and police agencies.

The probability of future hazardous materials release events can be considered *possible* according to the Risk Factor Methodology (see Table 4.4-1).

4.3.19.5 Vulnerability Assessment

Jurisdictions that are home to one or more hazardous materials facilities should be considered vulnerable to hazardous materials releases from fixed facilities. Structures, critical facilities, and populations located near hazardous material areas are also at risk. Table 4.3.18-5 shows the total number of structures in hazardous materials hazard areas defined as a 1.5-mile radius from any TRI facility. The table only includes municipalities with structures that are vulnerable. Eleven of Centre County's municipalities have structures within hazardous materials hazard area. A number of municipalities are more at risk than others with higher percentages of structures within hazardous materials hazard areas including the Spring Township (66 percent), Ferguson Township (44 percent), College Township (41 percent), and State College Borough (25 percent).

Table 4.3.18-5 also shows the total number of critical facilities in hazardous materials areas by municipality. Note that the critical facility analysis for hazardous material hazard areas does not include TRI facilities classified as a critical facility as these sites are those that define the hazard area in this analysis. Eleven of Centre County's municipalities have critical facilities within hazardous materials hazard area. A number of municipalities are more at risk than others with higher percentages of critical facilities within hazardous materials areas including Ferguson Township (22 critical facilities) and State College Borough (21 critical facilities). There are 34 day care centers located in areas vulnerable to hazardous materials release. This represents the biggest portion of critical facilities in these areas. Schools (15) and congregate care (9) are the other highest concentration of critical facilities located in these areas. In the event of hazardous materials release, these facilities may be susceptible to water contamination.

Table 4.3.19-5: Structures and Critical Facilities Vulnerable to Hazardous Materials Release, 2024

MUNICIAPLITY	TOTAL STRUCTURES	STRUCTURES IN HAZARDOUS MATERIAL HAZARD AREA	PERCENT STRUCTURES IN HAZARDOUS MATERIAL HAZARD AREA	TOTAL CFS	CFS IN HAZARDOUS MATERIAL HAZARD AREA	PERCENT CFS IN HAZARDOUS MATERIAL HAZARD AREA
Bellefonte Borough	3,608	133	4%	21	1	5%
Benner Township	4,185	1,641	39%	26	13	50%
Centre Hall Borough	1,006	781	78%	5	5	100%
College Township	6,214	2,533	41%	42	12	29%
Ferguson Township	9,125	3,972	44%	34	22	65%
Patton Township	6,567	131	2%	24	2	8%
Philipsburg Borough	1,811	1,031	57%	12	5	42%
Rush Township	4,587	1,194	26%	15	4	27%
Spring Township	6,153	4,038	66%	26	8	31%
State College Borough	7,332	1,828	25%	30	21	70%
Walker Township	4,311	9	17%	42	4	10%
Countywide Total	**97,869**	**17,291**	**36%**	**439**	**97**	**22%**

4.3.19.6 Equity in Vulnerable Communities

Marginalized communities, particularly low-income and minority populations, are often located near industrial facilities, waste sites, and transport routes for hazardous materials. These areas are more likely to experience spills, leaks, or accidents involving toxic substances making them more susceptible. Children, the elderly, and people with preexisting health conditions are particularly vulnerable to the effects of hazardous materials. Municipalities with high concentrations of these groups should plan accordingly. In addition, Penn Township, Milheim Borough, Haines Township, Miles Township, Marion Township, and Walker Township have the highest concentration of people without health insurance.

4.3.20 Environmental Hazards – Conventional Oil and Gas Wells



4.3.20.1 Location and Extent

Oil and gas development in Pennsylvania is extensive and has been ongoing for over 150 years, with the most recent phase of exploration and production activities targeting the Marcellus and Utica shales. Regulatory standards for the industry have evolved significantly as a function of both advances in technology and a more intense focus on environmental protection. More than 350,000 oil and gas wells have been drilled in Pennsylvania since the first commercial oil well was developed in 1859 (PA DEP-OOGM, 2010).

Additionally, oil and gas development had been taking place for nearly a century prior to permitting requirements enacted in 1955, an estimated 100,000 to 560,000 abandoned wells are yet to be accounted for in the state (PA DEP, 2020c). As of March 2024, 200 orphaned wells have been plugged with the help of grant funding as part of the Bipartisan Infrastructure Law (BIL) passed in 2021 (ECOS 2024). Efforts to plug abandoned wells are expected to continue with ongoing grant support. PA DEP differentiates between conventional and unconventional oil and gas wells. Conventional wells are traditional vertical wells, while unconventional wells are typically horizontally drilled wells commonly associated with the Marcellus Shale. Unconventional gas wells are profiled in Section 4.3.21.

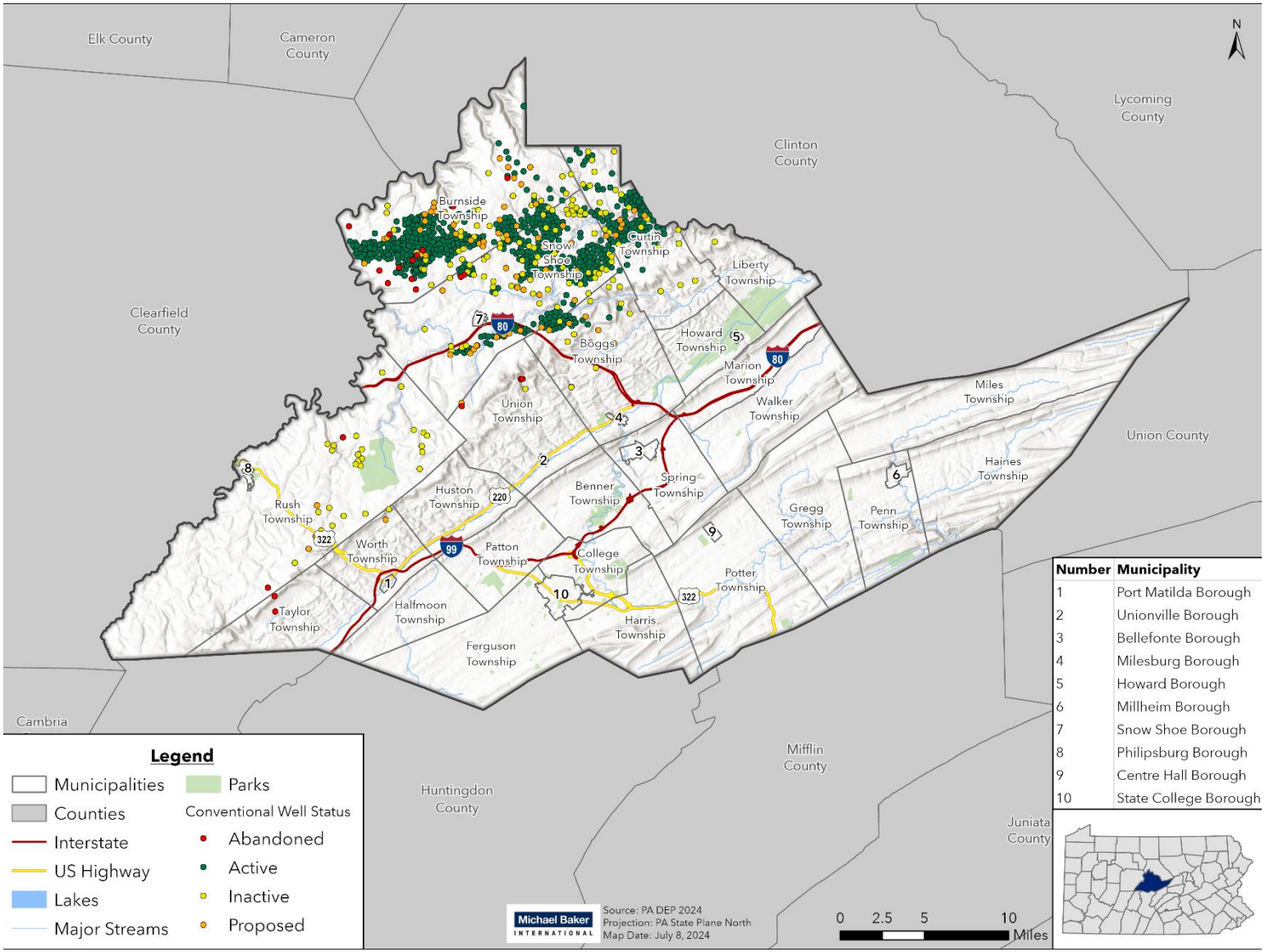
In Centre County, most wells are conventional (1,417 out of 1,614). There are 674 active and 743 inactive conventional wells in the county. As shown in Figure 4.3.20-1, conventional oil and gas wells are located in the northwestern and western part of the County, mostly concentrated in Burnside, Snow Shoe, and Curtin Townships (PA DEP, 2024e).

Private water supplies such as domestic drinking water wells in the vicinity of oil and gas wells are at risk of contamination from brine and other pollutants including methane, which can pose a fire hazard. For more information on public and private water supplies, see Section 4.3.20.5.

4.3.20.2 Range of Magnitude

As is the case with all-natural resource extraction, a variety of potential hazards exist with oil and gas extraction. Abandoned oil and gas wells that are not properly plugged can contaminate groundwater and consequently domestic drinking water wells. Surface waters and soil are sometimes polluted by brine, a salty wastewater product of oil and gas well drilling, and from oil spills occurring at the drilling site or from a pipeline breach. This can spoil public drinking water supplies and be particularly detrimental to vegetation and aquatic animals.

Figure 4.3.20-1: Conventional Oil and Gas Well Locations in Centre County



Methane can leak into domestic drinking wells and pose fire and explosion hazards. In addition, natural gas well fires can occur when natural gas is ignited at the well site. Often, these fires erupt during drilling when a spark from machinery or equipment ignites the gas. The initial explosion and resulting flames have the potential to seriously injure or kill individuals in the immediate area. These fires are often difficult to extinguish due to the intensity of the flame and the abundant fuel source. When methane gas from unplugged gas wells seeps into underground coal mines, miners are at risk of asphyxiation and are subject to impacts of explosion.

Though injury and death have resulted from oil and gas well drilling and extraction, the majority of impacts from this human-made hazard are environmental in nature. Wells that are improperly drilled or plugged can contaminate groundwater resulting in water well contamination or eventually surface water contamination. Drilling additives stored on site can leak and contaminate soil, surface water, and groundwater. Oil leaks at the well site from oil pipelines contaminate soil and surface water and damage aquatic life and ecosystems.

The impacts of oil and natural gas wells range in magnitude and extent. There are several potential impacts, including those on water, land, and air. Common accidents involving gas well sites include "blowouts," which are an explosion or failure of the rig, as well as the potential for chemical contamination. Beyond the purely environmental impacts of drilling, Centre County is likely to see significant indirect effects on its transportation infrastructure and land cover.

The potential impacts of conventional oil and gas wells on community lifelines are as follows:

Table 4.3.20-1: Most Likely Lifelines Impacted by Conventional Oil and Gas Wells

LIFELINE	NOTES
	Community safety may be endangered, and fire departments may be called into response and recovery if leaks or other issues result in explosions and fires.
	Impacts from conventional wells include environmental contaminations, which can impact agricultural operations and water supplies.
	Potential environmental contamination can have adverse health impacts on communities, leading to more strain on the local healthcare system.

Table 4.3.20-1: Most Likely Lifelines Impacted by Conventional Oil and Gas Wells

LIFELINE	NOTES
	Issues with drilling operations may lead to additional challenges with energy production.

4.3.20.3 Past Occurrence

Pennsylvania has a long history of oil and gas well drilling and, though relatively infrequent, many accidents and incidents have occurred related to the extraction of these natural resources. No comprehensive list of oil and gas related incidents exists for the Commonwealth; however, State Impact reports on violations of active wells. PA DEP issued its 2022 Oil and Gas Annual Report showing that across the Commonwealth, there were 5,416 conventional oil and gas well violations reported as compared to 1,360 for unconventional wells. The number of violations has been increasing since 2019, in which there were 1,763 violations for conventional wells and 985 violations for unconventional wells. The DEP noted that it was not able to conduct as many inspections at active well sites as in previous years due to the COVID-19 pandemic. PA DEP also reported a reduction in well permit issuing times by more than 75 percent from 2017 to 2019 (PADEP-OOGM, 2019).

While no oil and gas well drilling incidents were identified in the Centre County EMA incident log, a handful of incidents involving oil or gas spills or leaks were recorded. This log has been maintained from January 1989 to present (data for this plan was obtained in August 2024). While this is not a comprehensive source of all incidents in Centre County, it provides an inventory of events that the EMA has been involved with. As shown in Table 4.3.20-2, a gas well valve leak and two fires occurred in Centre County. No incidents have occurred since the 2021 Plan Update.

Table 4.3.20-2: Oil and Gas Well Drilling Incidents Recorded in Centre County (Centre County EMA, 2024)

DATE	TYPE	INCIDENT	LOCATION
09/02/89	Fire	Gas Drilling Rig	Curtin Twp
06/02/90	Fire	Gas Well Fire	Snow Shoe Twp
1/28/2012	Gas Well	Gas Well Valve Leak	Bank St, Orviston, Curtin Twp.

4.3.20.4 Future Occurrence

It is difficult to predict when and where environmental hazards will arise as they are often related to equipment failure and human error. Adequate monitoring through PA DEP will reduce the likelihood of potential impacts to the community and to the environment. Risk associated with oil and gas drilling is expected to remain moderate.

The number of permits issued for oil and gas wells decreases each year, though production continues to increase. Additionally, the number of orphaned and abandoned wells has increased. In PA DEP's 2019 Annual Report, they identified a study in partnership with DCNR in Cornplanter State Forest to measure methane leakage from identified orphan wells. This research will help PA DEP better estimate methane emissions from the thousands of orphaned and abandoned wells in Pennsylvania and determine how to quantify threats from abandoned wells.

Based on the short history of past occurrence, the probability of future conventional oil and gas well event is considered *possible* according to the Risk Factor Methodology (see Section 4.4-1).

4.3.20.5 Vulnerability Assessment

Structures and critical facilities located near conventional well hazard areas are also at risk. Table 4.3.20-3 shows total number of structures in conventional well hazard areas, which are defined as the area within 1,000 yards of any conventional oil or gas well. Of the total 35 municipalities, 12 have structures located near conventional wells. While Snow Shoe Township contains the highest number of structures located in conventional well hazard areas (1,392), Burnside Township has the highest percentage of structures located in these areas (87 percent).

Table 4.3.20-3 also shows total number of critical facilities in conventional well hazard areas by municipality. A total of three municipalities have critical facilities located near conventional wells: Burnside Township (3), Curtin Township (2), Taylor Township (2). All of Burnside Township's and Curtin Township's critical facilities are within conventional well hazard areas. These facilities include two dams, one fire station, three water treatment plants and one sewer treatment plant. Dams and water and sewer treatment plants in vulnerable areas maybe susceptible to water contamination during conventional well hazard event. This table does not include conventional wells or unconventional wells for analysis.

Table 4.3.20-3: Structures and Critical Facilities Vulnerable to Conventional Oil and Gas Wells, 2024

MUNICIAPLITY	TOTAL STRUCTURES	STRUCTURES IN CONVENTIONAL WELL HAZARD AREA	PERCENT STRUCTURES IN CONVENTIONAL WELL HAZARD AREA	TOTAL CFS	CFS IN CONVENTIONAL WELL HAZARD AREA	PERCENT CFS IN CONVENTIONAL WELL HAZARD AREA
Boggs Township	3,300	389	12%	8	-	-
Burnside Township	753	658	87%	3	3	100%
Curtin Township	1,055	399	38%	2	2	100%
Liberty Township	2,430	87	4%	6	-	-
Marion Township	1,346	5	0%	5	-	-
Rush Township	4,587	91	2%	26	-	-
Snow Shoe Borough	595	33	6%	3	-	-
Snow Shoe Township	2,677	1,392	52%	6	-	-
Taylor Township	1,281	29	2%	1	2	33%
Union Township	1,865	6	0%	7	-	-
Walker Township	4,311	33	1%	12	-	-
Worth Township	1,059	45	4%	3	-	-
CountywideTotal	**97,869**	**3167**	**3%**	**439**	**7**	**2%**

4.3.20.6 Equity in Vulnerable Communities

Equity considerations for conventional oil and gas wells focus on the disproportionate impacts these operations have on marginalized communities. Low-income, rural, and minority populations are often located closer to conventional oil and gas wells, exposing them to air and water contaminations, noise pollution, and the risk of accidents or spills. In addition, Penn Township, Milheim Borough, Haines Township, Miles Township, Marion Township, and Walker Township have the highest concentration of people without health insurance.

4.3.21 Environmental Hazards – Unconventional Oil and Gas Wells

4.3.21.1 Location and Extent



PA DEP defines unconventional wells as wells drilled deep into shale rock formations found thousands of feet underground. These formations, mainly Marcellus Shale and Utica Shale, contain and produce natural gas. These wells use horizontal drilling techniques that use large quantities of high-pressured water, approximately one to eight million gallons, mixed with sand and other additives including hydrochloric and muriatic acid, to hydraulically fracture the rock. This practice is more commonly known as fracking. This type of extraction presents unique challenges for the County.

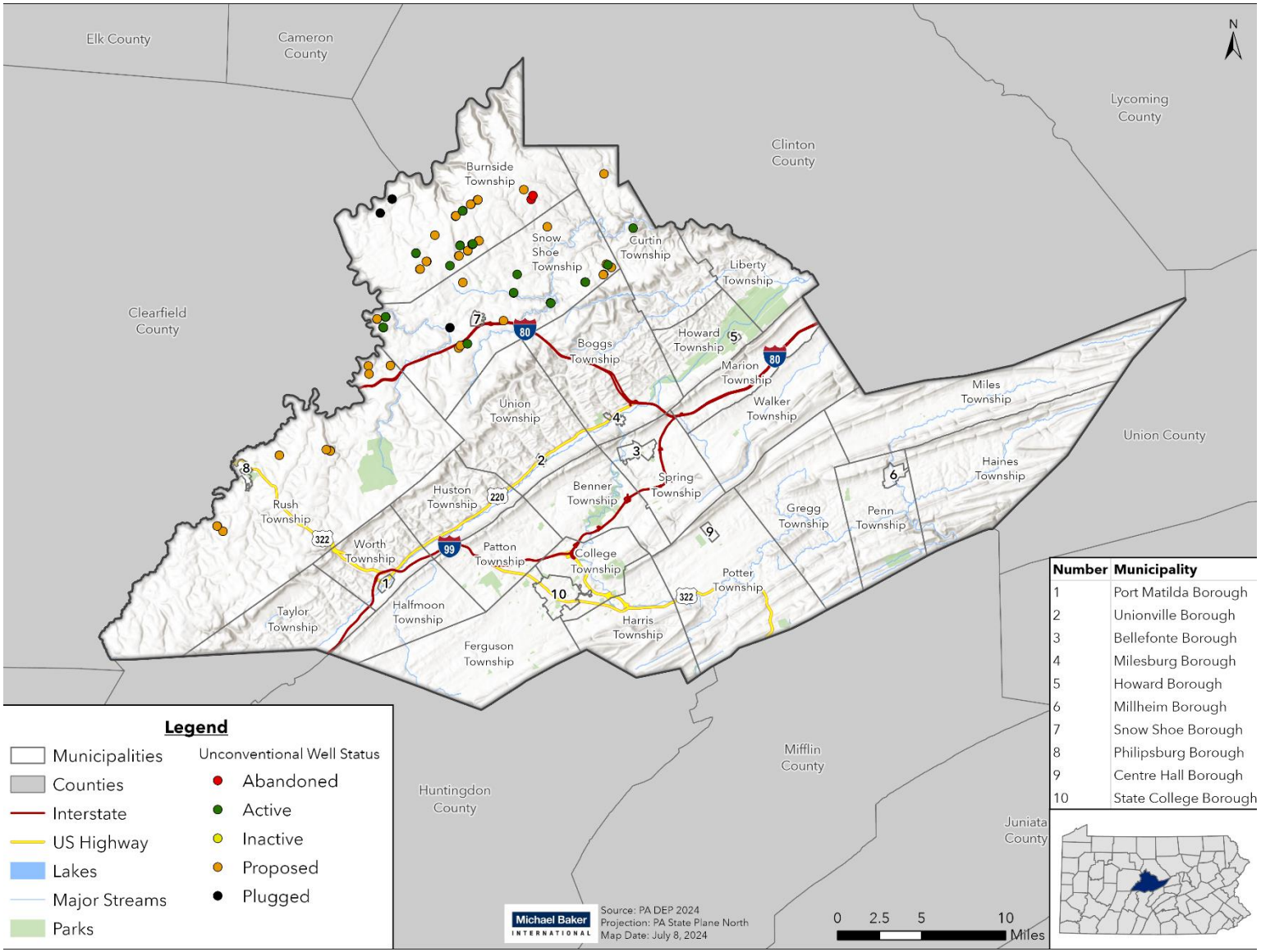
There are 29 active and 168 inactive unconventional wells. As shown in Figures 4.3.21-1 and similar to conventional wells, unconventional wells are also concentrated in the northern part of the County, primarily in Burnside, Snow Shoe, and Curtin Townships.

4.3.21.2 Range of Magnitude

There are some similarities in Range of Magnitude for both unconventional wells and conventional wells, though unconventional gas mining presents its own set of hazards as well.

The Marcellus Shale formation exists at a depth normally between 5,000 and 8,000 feet and holds trillions of cubic feet of natural gas. Extraction from this depth was previously not feasible but as drilling technology has improved over the years, recovering natural gas from Marcellus Shale is now possible (PADEP-OOGM, 2010). This extraction process is different from traditional natural gas extraction in that it often requires horizontal drilling. Horizontal drilling is accomplished by hydraulic fracturing, which involves pumping one to eight million gallons of water, mixed with sand and other additives including hydrochloric or muriatic acid, into the shale formation. The fluid or "frac fluid" that is recovered from this process must be properly treated as the water quality is very poor.

Figure 4.3.21-1: Unconventional Oil and Gas Well Locations in Centre County



This extraction process is different from traditional natural gas extraction in that it often requires horizontal drilling. Horizontal drilling is accomplished by hydraulic fracturing which involves pumping one to eight million gallons of water, mixed with sand and other additives including hydrochloric or muriatic acid, into the shale formation. The fluid or "frac fluid" that is recovered from this process must be properly treated as the water quality is very poor.

Frac fluid is extremely saline and can be three to six times as salty as sea water. Other contaminants can include barium, bromine, lithium strontium, sulfate, ammonium, and very high concentrations of total dissolved solids (TDS). There is also some concern about normally occurring radioactive materials (NORMS) present in shale and potentially present in recovered drilling fluid, but there is very little data available on the radioactivity of frac fluid in Pennsylvania (Kirby, 2010).

Methods to desalinize liquid, including frac fluid, are being studied, with forward osmosis and ion concentration polarization among the most recently explored methods (Shahidul et al, 2019 and Choi et al, 2019). High levels of total dissolved solids (TDSs), though not harmful to humans, can be extremely harmful to aquatic life and can damage industrial equipment. Often, recovered frac fluid is stored in earthen impoundments and after treatment is taken to a sewage treatment facility. There is concern surrounding the toxic solid waste that remains after frac fluid is treated.

In addition to the traditional hazards associated with oil and gas well drilling, potential impacts from Marcellus Shale gas well drilling include:

- Surface water depletion from high consumptive use with low return rates affecting drinking water supplies, and aquatic ecosystems and organisms.
- Contaminated surface and groundwater resulting from hydraulic fracturing and the recovery of contaminated hydraulic fracturing fluid.
- Mishandling of solid toxic waste.
- Public health concerns.

The water used for hydraulic fracturing is composed of 87 chemicals, some of which have the potential to cause a danger to health of life (PADEP-OOGM, 2010). Beyond the purely environmental impacts of drilling, Centre County is likely to be see significant indirect effects on its transportation infrastructure and land cover.

The worst-case scenario for an oil or gas well incident would be if there was a discharge of pollutant material like frac fluid into the waterways of Centre County. This is particularly an issue in the southern and central portions of the county, where there are a higher number of reported domestic water wells and potentially, a greater amount of reliance on these wells for potable water supply.

DOH has indicated some level of concern regarding unconventional drilling. Both unconventional and conventional wells are often located near residential areas, and there are growing concerns among the public, media and researchers about environmental contamination of water, air and soil from drilling and associated operations (e.g., pipelines, compressor stations, wastewater storage). These concerns have raised numerous questions about adverse health impacts associated with unconventional drilling. In March 2017, PA DOH developed a confidential health registry to better track and respond to public health complaints related to these types of wells. 203 total health complaints have been logged by PA DOH across the Commonwealth (PA DOH, 2024b).

The potential impacts of unconventional oil and gas wells on community lifelines are as follows:

Table 4.3.21-1: Most Likely Lifelines Impacted by Unconventional Oil and Gas Wells

LIFELINES	NOTES
	Fire departments may be called into response and recovery if leaks or other issues result in explosions and fires.
	Impacts from unconventional wells include environmental contamination, which can impact agricultural operations and water supplies.
	Potential environmental contamination can have adverse health impacts on communities, leading to more strain on the local healthcare system.
	Issues with drilling operations may lead to additional challenges with energy production.

4.3.21.3 Past Occurrence

Pennsylvania has a long history of oil and gas well drilling and, though relatively infrequent, accidents and incidents have occurred related to the extraction of these natural resources. No comprehensive list of oil and gas related incidents exist for the Commonwealth; however, major gas and oil well incidents in Pennsylvania are captured in PEMA's incident management system, PEMA-KC. While access to this data is restricted, the PA HMP reported in 2023 that no gas and oil incidents were recorded between 2018 and 2023.

4.3.21.4 Future Occurrence

As is the case with conventional wells, it remains difficult to predict the number or frequency of unconventional well site incidents. It is difficult to predict when and where environmental hazards will arise as they are often related to equipment failure and human error. Adequate monitoring through the PA DEP will reduce the likelihood of potential impacts to the community and to the environment.

Overall, the probability of a future unconventional oil and gas well event is *possible* as defined by the Risk Factor Methodology (see Section 4.4-1).

4.3.21.5 Vulnerability Assessment

Structures and critical facilities located near unconventional well hazard areas are also at risk, which are defined as areas within 1,000 yards of any unconventional oil or gas well. Table 4.3.21-2 shows total number of structures in unconventional well hazard areas by municipality. Four municipalities have structures located near unconventional wells including Burnside, Curtin, Rush, and Snow Shoe Townships. Snow Shoe Township has the highest number of structures within the unconventional well hazard area (138). An analysis was also done to determine if any critical facilities were located in unconventional oil and gas well hazard areas. It was determined that there are no municipalities with critical facilities located near unconventional wells.

Table 4.3.21-2: Structures and Critical Facilities Vulnerable to Unconventional Oil and Gas Wells, 2024

MUNICIAPLITY	TOTAL STRUCTURES	STRUCTURES IN UNCONVENTIONAL WELL HAZARD AREA	PERCENT STRUCTURES IN UNCONVENTIONAL WELL HAZARD AREA
Burnside Township	753	71	9%
Curtin Township	1,055	5	0%
Rush Township	4,587	17	0%
Snow Shoe Township	2,677	138	5%
Countywide Total	**97,869**	**3,167**	**3%**

4.3.21.6 Equity in Vulnerable Communities

Equity considerations for unconventional oil and gas wells focus on the disproportionate impacts these operations have on marginalized communities. Low-income, rural, and minority populations are often located closer to unconventional oil and gas wells, exposing them to air and water contaminations, noise pollution, and the risk of accidents or spills. In addition, Penn Township, Milheim Borough, Haines Township, Miles Township, Marion Township, and Walker Township have the highest concentration of people without health insurance.

4.3.22 Nuclear Incidents



4.3.22.1 Location and Extent

Through a Memorandum of Understanding (MOU), the Nuclear Regulatory Commission (NRC) and FEMA share federal oversight for nuclear/radiological emergency response planning matters for licensed nuclear power plants. Their mutual efforts will be directed toward more effective plans and related preparedness measures at and in the vicinity of nuclear reactors and fuel cycle facilities. The MOU between the agencies was signed on January 14, 1980, in response to the president's decision on December 7, 1979, stating that FEMA will coordinate all federal planning for the off-site impact of nuclear/radiological emergencies; take the lead for assessing off-site nuclear/radiological emergency response plans and preparedness; make findings and determinations as to the adequacy and capability of implementing off-site plans; and communicate those findings and determinations to the NRC. The NRC reviews those FEMA findings and determinations, in conjunction with the NRC's on-site findings, to determine the overall state of emergency preparedness (Penn State, 2020c).

A separate MOU, dated October 22, 1980, deals with NRC and FEMA cooperation and responsibilities in response to an actual or potential nuclear/radiological emergency. Operations Response Procedures have been developed that implement the provisions of the Incident Response MOU. These documents are intended to be consistent with the Federal Radiological Emergency Response Plan, which describes the relationships, roles, and responsibilities of federal agencies for responding to accidents involving peacetime nuclear/radiological emergencies (Penn State, 2020c).

Centre County has one fixed nuclear facility located at Penn State University. The Penn State Breazeale Nuclear Reactor (PSBR) is the longest operating licensed research reactor in the United States. The reactor, designated R-2, is the result of the "Atoms for Peace" program started by President Dwight Eisenhower. At the time, the President of the University was Milton Eisenhower (the brother of the U.S. President). In 1953, the Penn State Board of Trustees authorized money for the reactor's construction, and the PSBR went live in 1955 (Penn State, 2020c).

The PSBR Laboratory Complex is also known as the Radiation Science and Engineering Center. In addition to the TRIGA Mark III Reactor, it also contains the Cobalt-60 Radiation

Facility, two hot cells, the Radiochemistry Laboratories, and supporting radiation sources, radiation detectors, and counting equipment (Penn State, 2020c).

The NRC encourages the use of Probabilistic Risk Assessments (PRAs) to estimate quantitatively the potential risk to public health and safety when considering the design, operations, and maintenance practices at nuclear power plants. PRAs typically focus on accidents that can severely damage the core and that may challenge containment. FEMA, PEMA, and county governments have formulated Radiological Emergency Response Plans (RERPs) to prepare for nuclear/radiological emergencies at the five nuclear power-generating facilities in the Commonwealth of Pennsylvania. These plans include the following:

- A Plume Exposure Pathway Emergency Planning Zone (EPZ) within a radius of 10 miles from each power plant
- An Ingestion Exposure Pathway EPZ within a radius of 50 miles from each plant

Plume Exposure Pathway refers to whole-body external exposure to gamma radiation from the plume and from deposited materials and inhalation exposure from the passing radioactive plume. The duration of primary exposures could range in length from hours to days. The Ingestion Exposure Pathway refers to exposure primarily from ingestion of water or foods such as milk and fresh vegetables that have been contaminated with radiation. The exact size and configuration of the EPZ may vary in relation to local emergency response capabilities, topography, road networks, and political boundaries.

The County RERPs, which are part of the County Emergency Operations Plan, also include the following:

- Preventive and emergency protective actions.
- Response levels and associated protective action guides (PAGs) for food.
- Recommended PAGs within an Ingestion Exposure Pathway EPZ.
- Information for farmers to assist in protection of their livestock and crops from radioactive contamination.

Nuclear facilities must notify the appropriate authorities in the event of an accident. The federally recognized classification levels are Unusual Event, Alert, Site Area Emergency, and General Emergency. After a nuclear/radiological incident, the main concern is the effect on the health of the population near the incident. External radiation, inhalation, and ingestion of radioactive isotopes can cause acute health effects (death, severe health impairment), chronic health effects (cancers), and psychological effects that can impact health. Additional considerations include the long-term effects to the environment and agriculture.

PEMA has a Nuclear Evacuation plan in order to effectively target response to a nuclear incident. For evacuation the Commonwealth uses a keyhole approach where only sub areas that are directly impacted by a nuclear incident have to evacuate or shelter. This method allows for focused resources and attempt to minimize unnecessary strain on emergency services.

4.3.22.2 Range of Magnitude

The PSBR is a one-Megawatt Mark III TRIGA Reactor (Penn State, 2020c). The reactor is licensed pursuant to Title 10 Code of Federal Regulations, Chapter 1, Part 50, as a research and utilization reactor, Facility Operating License No. R-2 (Docket No. 50-5). The SBR does not provide electricity to the Penn State campus, rather it is used explicitly for education and research. This is also because the output of the reactor is only one thermal Megawatt and licensed to only operate at that level by the NRC. For a comparison, Three Mile Island has a net generating capacity of 852 Megawatts.

Susquehanna Steam Electric Station is the closest nuclear power plant, approximately 100 miles away from Centre County; all other nuclear power plants in the state are over 110 miles away. Centre County lies just on the edge of the Susquehanna Steam Electric Station 50-mile Ingestion Exposure Pathway EPZ designated for nuclear/radiological emergencies. The magnitude of a nuclear incident differs for those within the Plume Exposure Pathway EPZ and those within the Ingestion Exposure Pathway EPZ. The Plume Exposure Pathway refers to whole-body external exposure to gamma radiation from a radioactive plume and from deposited materials and inhalation exposure from the passing radioactive plume. The duration of primary exposures could range in length from hours to days. The Ingestion Exposure Pathway refers to exposure primarily from ingestion of water or foods such as milk and fresh vegetables that have been contaminated with radiation.

Nuclear accidents themselves are classified into three categories:

- Criticality accidents: Involves loss of control of nuclear assemblies or power reactors.
- Loss-of-coolant accidents: Occurs whenever a reactor coolant system experiences a break or opening large enough so that the coolant inventory in the system cannot be maintained by the normally operating make-up system.
- Loss-of-containment accidents: Involves the release of radioactivity from materials such as tritium, fission products, plutonium, and natural, depleted, or enriched uranium. Points of release have been containment vessels at fixed facilities or damaged packages during transportation incidents.

Nuclear facilities must notify the appropriate authorities in the event of an accident. The NRC uses four classification levels for nuclear incidents (NRC, 2020a):

- Unusual Event: Under this category, events are in process or have occurred which indicate potential degradation in the level of safety of the plant. No release of radioactive material requiring offsite response or monitoring is expected unless further degradation occurs.
- Alert: If an alert is declared, events are in process or have occurred which involve an actual or potential substantial degradation in the level of safety of the plant. Any releases of radioactive material from the plant are expected to be limited to a small fraction of the EPA Protective Action Guides (PAGs).
- Site Area Emergency: A site area emergency involves events in process or which have occurred that result in actual or likely major failures of plant functions needed for protection of the public. Any releases of radioactive material are not expected to exceed the EPA PAGs except near the site boundary.
- General Emergency: A general emergency involves actual or imminent substantial core damage or melting of reactor fuel with the potential for loss of containment integrity. Radioactive releases during a general emergency can reasonably be expected to exceed the EPA PAGs for more than the immediate site area.

The accident at the Three Mile Island Generating Station in March 1979 remains the nation's only nuclear incident at the General Emergency level and remains the worst nuclear incident on record in the Commonwealth and the nation. During this incident, equipment malfunctions, design-related problems, and worker errors led to a partial meltdown of the TMI Unit 2 reactor core at TMI.

The worst-case radiological release event would be a major release of radioactive material from the PSBR. This event could generate a great deal of fear for residents of Centre County and central Pennsylvania. Specific impacts would depend on the extent and spread of the contamination, although it would likely affect the Penn State University campus. However, as previously mentioned, the PSBR is much smaller than power-generating reactors.

The nuclear industry has adopted pre-determined, site-specific Emergency Action Levels (EALs). The EALs provide the framework and guidance to observe, address, and classify the severity of site-specific events and conditions that are communicated to off-site emergency response organizations (NRC, 2020b). There are additional EALs that specifically deal with issues of security, such as threats of airborne attack, hostile action within the facility, or facility attack. These EALs ensure that appropriate notifications for the security threat are made in a timely manner. Each facility is also equipped with a public alerting system, which includes a number of sirens to alert the public located in the Plume Ingestion Pathway EPZ. This alerting system is activated by the counties of each specific EPZ. Emergency notifications and instructions are communicated to the

public via the Emergency Alert System as activated by the SEOC. State officials also have the capability to send emergency messages as text messages to mobile devices.

The potential impacts of nuclear incidents on community lifelines are as follows:

Table 4.3.22-1: Most Likely Lifelines Impacted by Nuclear Incidents

LIFELINE	NOTES
Safety and Security	Community safety due to potential harm from radioactivity.
Food, Hydration, Shelter	Potential long-term effects of radioactive contamination for water resources and agricultural operations.
Health and Medical	The immediate impacts on public health and the potential long-term health impacts including cancers and psychological impacts will increase the amount of resources needed at local healthcare facilities.

4.3.22.3 Past Occurrence

Since the PSBR was built in 1955, there have been no accidents or evacuations involving a degradation or problem with the reactor. The reactor control system is designed to shut down the reactor automatically if any preset limits are reached. These limits are set well below the established safety parameters. In 2007, a minor leak of "slightly radioactive water" was reported. Authorities discovered the leak during a routine check of the pool water levels that naturally decrease with evaporation.

It was not considered a health risk due to the low radiation levels. It was reported that radiation levels were just above the drinking water standard and dissipation would further reduce any measurable radiation levels by the time any water leakage would have reached a water table. The reactor holds 71,000 gallons of water. The reactor was shut down, workers drained the pool and resurfaced its walls, which seemed to stop the leak, although no specific cause of the water loss was identified (Penn State, 2007).

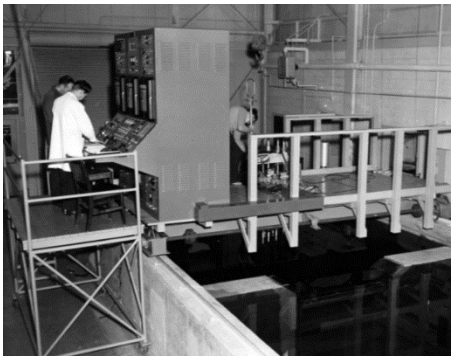


Figure 4.3.22-1: Three Mile Island

Nuclear incidents rarely occur, but the incident at Three Mile Island is the worst fixed-nuclear facility accident in U.S. history. The resulting contamination and state of the reactor core led to the development of a 14-year cleanup and scientific effort. Additionally, the President's Commission on the Accident at Three Mile Island examined the costs of the accident, concluding, "The accident at Three Mile Island on March 28, 1979, generated considerable economic disturbance. Some of the impacts were short term, occurring during the first days of the accident. Many of the impacts were experienced by the local community; others will be felt at the regional and national levels." The report concluded: "It appears clear that the major costs of the TMI Unit 2 accident are associated with the emergency management replacement power and the plant refurbishment or replacement. The minimum cost estimate of nearly $1 billion supports the argument that considerable additional resources can be cost effective if spent to guard against future accidents."

The accident at Three Mile Island had a profound effect on the residents, emergency management community, government officials and nuclear industry, not only in Pennsylvania, but nationwide. There were minimal requirements for off-site emergency planning for nuclear power stations prior to this accident.

Afterwards, comprehensive, coordinated, and exercised plans were developed for the state, counties, school districts, special facilities (hospitals, nursing homes and detention facilities) and municipalities to assure the safety of the population.

Despite the severity of the damage, no injuries due to radiation exposure occurred. However, numerous studies were conducted to determine the measurable health effects related to radiation and/or stress. More than a dozen epidemiological and stress related studies conducted to date have found no discernible direct health effects to the population in the vicinity of the plant. However, one study conducted by the PA DOH's Three Mile Island Health Research Program did find evidence of psychological stress (Nuclear Energy Institute, 2019).

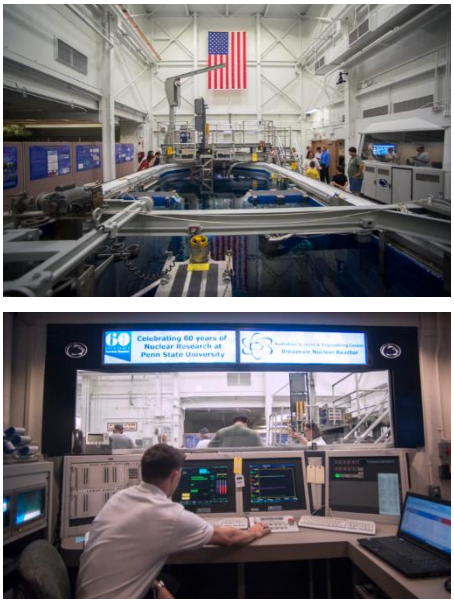


Figure 4.3.22-2: Penn State Breazeale Nuclear Reactor (Penn State News, 2020)

4.3.22.4 Future Occurrence

In late 2009, the NRC extended the operating license of the facility for two additional decades (Penn State, 2020c). Penn State University was commended for good safety measures and reviews of aspects such as the structural integrity of the building and its defense against radiation were satisfactory. It should be noted,

however, that following the September 11, 2001 attacks, the NRC deemed it "at risk," despite its small size, as a potential terrorist target. Penn State University maintains an in-house capability to control most hazards which may occur in this facility. They also maintain mutual aid agreements with other agencies designated in their emergency plan.

Overall, the probability of future nuclear incident events is *unlikely* as defined by the Risk Factor Methodology (See Section 4.4-1).

4.3.22.5 Vulnerability Assessment

The Director of the Radiation Science and Engineering Center is ultimately responsible for safe operation of the facility, assisted by a staff dedicated to the safe conduct of facility operations. The Director and staff operate under several licenses issued by the NRC for operation of the nuclear reactor and associated facilities, and for the control of radioactive materials. A Penn State Reactor Safeguards Committee (PSRSC), consisting of university and industry representatives, meets quarterly to review facility operations. The PSRSC also appoints an auditor to perform an annual audit of facility operations for compliance. According to the NRC's report on the reactor during the recent (2009) renewal of its operating license, the facility poses "no significant radiological risk to the health and safety of the public, facility personnel, or the environment." The report also concluded the reactor has adequate funding and qualified personnel to continue operation for the next 20 years. Furthermore, evacuation drills are also conducted on an annual basis to assess response capabilities.

4.3.22.6 Equity in Vulnerable Considerations

Regarding equity and nuclear incidents, marginalized communities often face disproportionate risks due to their proximity to nuclear facilities, limited access to emergency services, and reduced capacity for evacuation and recovery. State College Borough, Miles Township, and Haines Township have the highest concentration of households without a vehicle while State College Borough, Patton Township, College Township, and Miles Township who have higher concentrations of households with limited English. These communities may experience higher exposure to radiation, face barriers to timely medical care, and struggle with long-term recovery issues. Equity considerations involve education on awareness and evacuation.

4.3.23 Substance Use Disorder

4.3.23.1 Location and Extent



Substance use disorder occurs when an individual becomes physically dependent on an opioid, a class of drugs that reduce pain. Opioid is used as a broad term and includes opiates, which are drugs naturally extracted from certain types of poppy plants and narcotics. Opioids can also be synthetically made to emulate opium.

According to the Drug Enforcement Administration (DEA) opioids come in various forms: tablets, capsules, skin patches, powder, chunks in various colors from white to shades of brown and black, liquid form for oral use and injection, syrups, suppositories, and lollipops. The Centers for Disease Control and Prevention (CDC) defines the following as the three most common types of opioids:

- Prescription Opioids: Opioid medication prescribed by doctors for pain treatment. Prescription opioids can be synthetic-oxycodone (OxyContin) or hydrocodone (Vicodin), or natural, like morphine.
- Fentanyl: A powerful synthetic opioid that is 50 to 100 times more powerful than morphine and is used for treating severe pain. Illegally made and distributed fentanyl is becoming more prevalent.
- Heroin: An illegal natural opioid processed from morphine and is also becoming more commonly used in the United States.

The CDC estimates that nearly 38 out of every 100,000 Pennsylvania residents died from opioid-related overdoses in 2016, higher than the national rate of opioid-related deaths of approximately 20 out of 100,000 people.

In Pennsylvania, overdoses caused by opioids have become the leading cause of accidental death, surpassing automobile accidents (CDC, 2018).

Opioids are highly addictive. They block the body's ability to feel pain and can create a sense of euphoria. Additionally, individuals often build a tolerance to opioids, which can lead to misuse and overdose. Fentanyl and fentanyl-related substances are hazardous materials and should be treated as such. Contact with fentanyl can impact first responders and family and friends of opioid users. Depending on the potency of the drug, it can take as a little as the equivalent of a few grams of table salt to cause health complications (DEA, 2020).

Substance use disorder impacts the entire Commonwealth. Nationally, Pennsylvania is among four of the hardest hit states from opioid-related deaths, along with West Virginia, Ohio, and New Hampshire.

People under the age of 35 have been particularly vulnerable to opioid abuse. According to a joint intelligence report prepared by the DEA Philadelphia Division and the University of Pittsburgh, between 2015 and 2016 in Pennsylvania, fentanyl use increased 380 percent among 15- to 24-year-olds while heroin use increased 970 percent in the 25- to 34-year age range. The report also documented a higher percentage of drug-related deaths attributed to opioid use in Pennsylvania's rural communities at 42 percent, compared to 34 percent in urban communities (DEA Philadelphia Division, 2017).

According to a recent study, environmental scientists at the Cary Institute of New York found traces of opioid and other drugs in streams, rivers, and lakes. These traces came from human urine and feces, and medications that have been flushed down the toilet. However, the ecological and environmental impacts are unknown. The EPA suggests that while the risks of pharmaceuticals found in wastewater, ambient water, and drinking water is low, further research is needed (US EPA, 2014a). A study published in 2022 which tested 52 drinking water sources in the US found hydrocodone and codeine in 40% of sampled sources. Fentanyl was not found in any of the sampled locations (Skaggs and Logue, 2022).

4.3.23.2 Range of Magnitude

Substance use disorder can lead to overdose, which can be fatal. The most dangerous side effect of an opioid overdose is depressed breathing. The lack of oxygen to the brain causes permanent brain damage, leading to organ failure, and eventually, death. Signs and symptoms include respiratory depression, drowsiness, disorientation, pinpoint pupils, and clammy skin.

Substance use disorder can also be passed from mother to child in the womb. This condition, known as neonatal abstinence syndrome (NAS), has increased five-fold from 2000 to 2012, according to the National Institute of Drug Abuse (NIDA), resulting in an estimated 22,000 babies in the United States born with this condition (NIDA, 2019). Between 2010 and 2017, the number of babies diagnosed with NAS increased by 82% (Hirai et al, 2021). Data from 2020 suggests that 59 children are diagnosed with NAS in the United States every day (CDC 2024).

First responders – paramedics, police officers, and fire fighters, are also affected by Pennsylvania's substance use disorder crisis. In addition to the crisis consuming time and resources, first responders also face exposure risk, particularly to synthetic fentanyl. According to the DEA, it takes two to three milligrams of fentanyl to induce respiratory depression, arrest, and possibly death. Since fentanyl is indistinguishable from several other narcotics and powdered substances, first responders must take extra precaution when dealing with calls related to drug abuse (Rushton, 2019).

In 2018, Centre County experienced three opioid-related deaths in six days. Local Law enforcement and the Centre County District Attorney's Office warned citizens about a possible rise in the sale of lethal illegal narcotics in the area (Rushton, 2019). In 2022, Centre County saw twenty-two deaths resulting from overdoses (Pallotto, 2023).

The potential impacts of substance abuse on community lifelines are as follows:

Table 4.3.23-1: Most Likely Lifelines Impacted by Substance Abuse

LIFELINES	NOTES
	Government services are needed to aid individuals with substance use disorder and police officers and other first responders may be at risk of exposure to certain substances.
	Medical services may be needed as substance use has negative impacts on public health and may require medical treatment and mental health services.

4.3.23.3 Past Occurrence

The CDC found that opioids are the main cause of drug-related overdoses and deaths, being responsible for nearly 75 percent of drug-related deaths nationally in 2017. Of the more than 4,600 drug-related deaths in Pennsylvania in 2016, nearly 84 percent were attributed to two or more drugs. Therefore, drug-related overdose and death statistics account for all drug types, however, as noted above, the majority of drug-related deaths involve opioids. The following table lists overdose deaths from 2015-2024:

Table 4.3.23-2: Number of Overdose Deaths in Centre County from 2015-2024 (Centre County Coroner's Office, 2024)

YEAR	NUMBER OF DEATHS
2015	15
2016	21
2017	11
2018	22
2019	9
2020	18
2021	14
2022	16
2023	10
2024	12

It is widely acknowledged that the opioid crisis began in the late 1990s when pharmaceutical companies introduced opioid-based pain medication, such as

OxyContin, Percocet, and Vicodin. As these drugs become more frequently prescribed, misuse and overdose increased and it became clear that prescription opioids were highly addictive (NIDA, 2020).

4.3.23.4 Future Occurrence

Pennsylvania has seen a steady rise in opioid-related deaths over the last several years, with drug-related death rates increasing 102 percent between 2014 and 2017. In 2017, Pennsylvania saw 5,425 overdose-related deaths. In 2020, overdose-related deaths were down to 5,170. 85% of deaths, or 4,398, were opioid-related (PA DOH, 2020).

However, future occurrences of substance use disorder and misuse, overdose, and fatalities are unclear as the state moves forward with overdose prevention initiatives. In January 2018, Governor Tom Wolf declared Pennsylvania's substance use disorders epidemic a disaster emergency. This declaration should enhance coordination and data collection between state and local responders, improve tools for families and first responders, and expand treatment access. The declaration also improves access to naloxone, a lifesaving drug that reverses the effects of a drug-overdose. In addition, a new Opioid Coordination Group is housed within PEMA (PA DOH, 2018).

In May 2016, a Memorandum of Understanding was executed, formally creating the Centre County Heroin and Opioid Prevention and Education (HOPE) Initiative (Centre County, 2020c). Members of the HOPE Initiative include those from the prevention, treatment, and recovery community; agencies involved in the Criminal Justice System, and members of the community affected by addiction. HOPE conducts widespread outreach and education to educate all community members about drug addiction with the goal of preventing overdoses and overdose deaths. HOPE also works to increase access to drug collection boxes, naloxone, and medication assisted therapies.

Overall, the probability of future opioid overdose and death is *highly likely* as defined by the Risk Factor Methodology (see Section 4.4.1).

4.3.23.5 Vulnerability Assessment

County facilities are not at risk to the opioid crisis, but there are some occupation-specific risks that may make some employees more vulnerable. Employees working in direct patient care are vulnerable to fentanyl exposure. Since fentanyl can be ingested orally, inhaled through the nose or mouth, or absorbed through the skin or eyes, any substance suspected to contain fentanyl should be handled with extreme caution. Exposure to a small amount of fentanyl can lead to respiratory depression or death. Fentanyl-related substances have been found in powders, pills, capsules, liquids, and on blotter paper. The DEA recommends that first responders carry a Personal Protective Equipment (PPE) kit that includes: nitrile gloves, N-95 dust masks, sturdy eye protection, paper coveralls and show protection, and naloxone injectors. The DEA also suggests

using extreme caution when using police dogs, as they are at serious risks to health complications from inhaling fentanyl and fentanyl-related substances (DEA, 2016). Absenteeism from jobs associated with a substance use disorder in high-risk areas could lead to economic loss through lost productivity and increased medical costs.

In general, jurisdictions that are more densely populated are more vulnerable to substance use disorder threats as access to the drugs increases. However, as stated above, rural communities have experienced larger per-capita opioid-related deaths. Jurisdictional losses in the substance use disorder crisis stem from lost wages, productivity, and resources rather than losses to buildings or land. Locally, many Pennsylvania counties have seen an increase of time and resources devoted to the opioid epidemic as overdose and response increases, however there is no comprehensive tracking mechanism to record total local losses associated with the opioid crisis.

Impacts including total costs to jurisdictions are only beginning to be understood, researched, and tracked. There is no comprehensive database currently tracking monetary losses at the local level. However, the American Enterprise Institute (AEI), using national data from the CDC and White House Council of Economic Advisors, calculated a total cost per capita ($1,799), of the opioid epidemic for Pennsylvania. Using this per capita estimate in combination with county population estimates, losses can be estimated for Centre County. It is important to note that this methodology assumes equal per capita opioid misuse and fatalities across all counties, however, based on reported drug overdoses and drug related deaths, it is known that some counties, including those in the southwestern region, are more vulnerable and more likely to experience higher per capita costs while counties in central and north central Pennsylvania tent to be less vulnerable and likely have lesser costs per capita. Another important caveat regarding this methodology is that a portion of the costs will have been state losses rather than County or jurisdictional, but the ratio of state to local cost burden is unknown at this time. It is estimated that Centre County has had a total per capita cost of $292,625,340.

4.3.23.6 Equity in Vulnerable Communities

Communities of concern when it comes to equity and substance use include marginalized communities. Oftentimes these communities frequently encounter obstacles to accessing substance use treatment and prevention services. Rush Township, Patton Township, and areas in State College Borough have the highest unemployment rates. State College and Bellefonte Borough also have the highest share of population living below the poverty level.

4.3.24 Terrorism



4.3.24.1 Location and Extent

The term "terrorism" refers to intentional, criminal, malicious acts, but the functional definition of terrorism can be interpreted in many ways. Officially, terrorism is defined in the Code of Federal Regulations as "the unlawful use of force and violence against persons or property to intimidate or coerce a government, the civilian population, or any segment thereof, in furtherance of political or social objectives" (28 CFR §0.85).

The Federal Bureau of Investigation (FBI) characterizes terrorism as either domestic or international, depending on the origin, base, and objectives of the terrorist organization. However, the origin of the terrorist or person causing the hazard is far less relevant to mitigation planning than the hazard itself and its consequences.

Terrorism refers to the use of weapons of mass destruction (WMD), including, biological, chemical, radiological, and nuclear weapons; arson, incendiary, explosive, and armed attacks; industrial sabotage and agriterrorism; intentional hazardous materials releases; and cyberterrorism.

Terrorism is a threat everywhere, but there are a number of important considerations in evaluating terrorism hazards, such as the existence of facilities, landmarks, or other buildings of international, national, or regional importance. High-risk targets for acts of terrorism include military and civilian government facilities, international airports, large cities, and high-profile landmarks. Terrorists might also target large public gatherings, water and food supplies, utilities, and corporate centers. Furthermore, terrorists are capable of spreading fear by sending explosives or chemical and biological agents through the mail (FEMA, 2009). Additionally, terrorists use threats to create fear, to try to convince citizens of the powerlessness of their government, and/or to get publicity for their cause. Nonetheless, terrorism can take many forms and terrorists have a wide range of personal, political, or cultural agendas.

The probability of terrorism cannot be quantified with as great a level of accuracy as that of many natural hazards. Furthermore, these incidents generally occur at a specific location, such as a government building, rather than encompassing an area such as a floodplain.

An important consideration in evaluating terrorism hazards is the existence of facilities, landmarks, or other buildings of international, national, or regional importance. Outside of Penn State University and the threat of an incident during a major event such as a football game or the Arts Festival, in the remainder of Centre County, while possessing

many notable landmarks from a local historic perspective, there are no sites that are considered significant landmarks in terms of national or international importance.

Nonetheless, terrorism can take many forms and terrorists have a wide range of personal, political, or cultural agendas. Therefore, there is no location that is not a potential terrorist target. Two types of terrorist activity are particularly relevant to Centre County: agriterrorism and intentional hazardous material releases. Agriterrorism is the direct, intentional, generally covert contamination of food supplies or introduction of pests and/or disease agents to crops and livestock. Centre County is semi-rural with a significant portion of its land area in the eastern county dedicated to agriculture.

There are also a number of SARA Title III facilities and major transportation routes that traverse the County; making intentional hazardous material releases a potential threat to citizens and the environment. This hazard is addressed in Section 4.3.19. Critical facilities including police stations, hospitals, fire stations, schools, wastewater treatment plants, water supply facilities, may be potential terrorist targets.

4.3.24.2 Range of Magnitude

Terrorist attacks can take many forms, including agriterrorism, arson/incendiary attack, armed attack, biological agent, chemical agent, cyberterrorism, conventional bomb, intentional hazardous material release, nuclear bomb, and radiological agent. The severity of terrorist incidents depends upon the method of attack, the proximity of the attack to people, animals, or other assets and the duration of exposure to the incident or attack device. For example, chemical agents are poisonous gases, liquids, or solids that have toxic effects on people, animals, or plants. Many chemical agents can cause serious injuries or death. In this case, severity of injuries depends on the type and amount of the chemical agent used and the duration of exposure.

Biological agents are organisms or toxins that have illness-producing effects on people, livestock, and crops. Some biological agents cannot be easily detected and may take time to develop. Therefore, it can be difficult to know that a biological attack has occurred until victims display symptoms. In other cases, the effects are immediate. Those affected by a biological agent require the immediate attention of professional medical personnel. Some agents are contagious which may result in the need for victims to be quarantined.

An evolving type of terrorist threat is Complex Coordinated Terrorist Attacks (CCTAs). CCTAs are acts of terrorism that involve synchronized and independent team(s) at multiple locations, sequentially or in close succession, initiated with little or no warning, and employing one or more weapon systems which could include firearms, explosives, fire as a weapon, and other nontraditional attack methodologies that are intended to result in large numbers of casualties (FEMA, 2018b). The dynamic of CCTAs cause the

threat to be unknown, which is a shift from the traditional symbolic and highly planned attacks. CCTAs could occur anywhere, at any time, with the potential for mass casualties and infrastructure damage.

Depending on the type of terrorist attack, there may be significant loss of life for humans and animals as well as economic losses. Additionally, the impact of the attack itself may be exacerbated by the fact that human services agencies like community support programs, health and medical services, public assistance programs, and social services can experience physical damage to facilities, supplies, and equipment and disruption of emergency communications. There may also be ancillary effects of terrorism such as urban fires or, in the case of a radiological device, radioactive fallout that can multiply the impact of a terrorist event.

A worst-case scenario event for Centre County would involve an active shooter incident or the use of explosive devices with radiological material at a public event at Penn State University, such as a football game. This type of event would cause casualties and fatalities across all demographics, and depending on the time of recovery, would cause severe economic losses. In addition to the physical injuries, there will be high emotional and behavioral impacts on the population who was near the attack, as well as the residents of Centre County who were not near the attack.

The potential impacts of terrorism on community lifelines are as follows:

Table 4.3.24-1: Most Likely Lifelines Impacted by Terrorism

LIFELINES	NOTES
	Community safety is often threatened, and police, fire, and other government services are either targeted or needed to respond to terroristic threats or actions.
	Water resources and the food supply chain may be targeted by biological terrorism.
	Energy infrastructure may be a potential target for terrorism.
	Hazardous materials facilities may be a potential target for terrorism.

4.3.24.3 Past Occurrence

There has been a high consciousness of terrorist activity in the press with few catastrophic events. The most significant terrorist attack on United States soil occurred on September 11, 2001; Flight 93, the fourth hijacked aircraft in the attack, crashed in Somerset County, Pennsylvania.

While there have not been any catastrophic terrorist attacks in Centre County, the County has experienced suspected terrorist incidents in the past. Centre County OES maintains an incident log, which contains 86 events related to terrorist activity and threats. This log has been maintained from January 1989 to present (data for this plan was obtained August 2024), with most of the terrorist activity occurring between 1996 and 2020. There have been four events since the last plan update, two each in 2023 and 2024. While this is not a comprehensive source of all incidents in Centre County, it provides an inventory of events with which OES has been involved.

58 of 86 terrorism-related incidents occurred in 2001. Most of these events were for suspicious mail, packages or unknown white powder in 2001, which were later determined to be false alarms. Two specific incidents occurred in State College during the 2001 anthrax scare, one incident occurring at the Army Recruiting Station and another involving anthrax-threatening letters sent to a medical clinic. Since 2001, only 13 incidents related to terrorist activity occurred in Centre County, the majority of which involved bomb threats. Most recently, Penn State police reported several non-specific bomb threats from a single caller in 2012. Other incidents included threats to an abortion clinic and to an adoption agency mistaken for an abortion clinic, as well as other school bomb threats. Unfortunately, in 2019 an active shooter killed two people and injured two others just two miles from Penn State's main campus. Though most of these incidents have also been unfounded, they still expend resources and require specialized training and equipment for emergency response personnel. Table 4.3.24-2 outlines the terrorism-related incidents reported to the county between 2021 and 2024.

Table 4.3.24-2: Terrorist Activity Recorded in Centre County OES Incident Log (Centre County EMA, 2024)

DATE	TYPE	INCIDENT	LOCATION
03/03/23	Terroristic Threats	Bomb Threat	University Park Airport
09/16/23	Terroristic Threats	Bomb Threat	State College Regional Airport (via email)
05/06/24	Terroristic Threats	Bomb Threat	McLanahan's Drug Store, PSU Campus
06/29/24	Terroristic Threats	Bomb Threat	Raising Cane's Chicken, PSU Campus

4.3.24.4 Future Occurrence

An important consideration in estimating the likelihood of a terrorist incident is the existence of facilities, landmarks, or other buildings of national or regional importance. As previously noted, aside from Penn State University, there are no sites which are considered significant landmarks in terms of national or international importance. The potential threat of an incident occurring during a major event such as a football game or the Arts Festival is greater, while the many notable landmarks from a local historic perspective throughout the County are less at risk.

Based on historical events, Centre County can expect to experience suspected terrorist incidents or threats each year. Although previous events have not resulted in what are considered significant terrorist attacks, the severity of a future incident cannot be predicted with a sufficient level of certainty. Prediction of terrorist attacks is almost impossible because terrorism is a result of human factors. As long as fringe groups maintain radically different ideas than that of the government or general population, terrorism is a possibility. Overall, the likelihood of a terrorist attack is considered *unlikely* as defined by the Risk Factor Methodology (See Section 4.4-1).

4.3.24.5 Vulnerability Assessment

Since the probability of terrorism occurring cannot be quantified in the same way as that of many natural hazards, it is not possible to assess vulnerability in terms of likelihood of occurrence. Instead, vulnerability is assessed in terms of specific assets. By identifying potentially at-risk terrorist targets in Centre County, planning efforts can be put in place to reduce the risk of attack. All communities in Centre County are vulnerable on some level, directly or indirectly, to a terrorist attack. However, communities where the previously mentioned potential targets are located should be considered more vulnerable. FEMA's Integrating Manmade Hazards into Mitigation Planning (2003) encourages site-specific assessments that should be based on the relative importance of a particular site to the surrounding community or population, threats that are known to exist, and vulnerabilities including:

Inherent Vulnerability

- Visibility – How aware is the public of the existence of the facility?
- Utility – How valuable might the place be in meeting the objectives of a potential terrorist?
- Accessibility – How accessible is the place to the public?
- Asset mobility – is the asset's location fixed or mobile?
- Presence of hazardous materials – Are flammable, explosive, biological, chemical and/or radiological materials present on site? If so, are they well secured?
- Potential for collateral damage – What are the potential consequences for the surrounding area if the asset is attacked or damaged?

- Occupancy – What is the potential for mass casualties based on the maximum number of individuals on site at a given time?

Tactical Vulnerability

Site Perimeter

- Site planning and Landscape Design – Is the facility designed with security in mind – both site-specific and with regard to adjacent land uses?
- Parking Security – Are vehicle access and parking managed in a way that separates vehicles and structures?

Building Envelope

Structural Engineering – Is the building's envelope designed to be blast-resistant? Does it provide collective protection against chemical, biological, and radiological contaminants?

Facility Interior

Architectural and Interior Space Planning – Does security screening cover all public and private areas?
Mechanical Engineering – Are utilities and Heating, Ventilating and Air Conditioning (HVAC) systems protected and/or backed up with redundant systems?
Electrical Engineering – Are emergency power and telecommunications available? Are alarm systems operational? Is lightning sufficient?
Fire Protection Engineering – Are the building's water supply and fire suppression systems adequate, code-compliant, and protected? Are on-site personnel trained appropriately? Are local first responders aware of the nature of the operations at the facility?
Electronic and Organized Security – Are systems and personnel in place to monitor and protect the facility?

Centre County has in place a mutual aid and cooperation agreement with Bedford, Blair, Fulton, Huntingdon, Juniata, Mifflin, and Snyder Counties to continue the South Central Mountains Regional Task Force (PEMA, n.d.). The task force was formed in 1998 in response the growing threat of the use of Weapons of Mass Destruction (WMDs). Key programs include planning and exercising in preparation for a large-scale hazardous event, training specialized response teams, and purchasing response and recovery equipment. The task force counties assist each other in the event of an emergency or disaster. In 2013, the Centre County Board of Commissioners, following a statewide directive, provided trainings to local emergency personnel to increase readiness in the area's emergency response teams to acts of terrorism – largely focusing on the response

to weapons of mass destruction (biological, chemical, or nuclear attack) (Gilmore, 2013).

Sites that may potentially be vulnerable to terrorist attacks include the following:

Township of Benner – Airports, and Rockview and SCI Benner Prison Facilities
Township of Boggs – Transportation Corridor (I-80)
Township of College – Penn State University Sports Complexes
Township of Ferguson – High Technology Business Parks
Township of Liberty – Foster Joseph Sayers Dam
Borough of Bellefonte – County Facilities
Borough of Centre Hall – Grange Fair Event
Borough of State College – Penn State University Facilities

4.3.24.6 Equity in Vulnerable Communities

Regarding equity in the face of an act of terrorism, there are several communities to consider. Emergency response plans should be included and take into account the needs of diverse populations, including non-English speakers, individuals with disabilities, and those with limited access to technological resources like smartphones or internet connections. State College Borough, Patton Township, College Township, and Miles Township have higher concentrations of households with limited English. State College Borough and areas in College Township and Benner Township have the largest minority populations. Potter Township, Gregg Township, Boggs Township, Milesburg Borough, Curtin Township, Howard Township, and Liberty Township have the largest percentage of population with a disability.

4.3.25 Transportation Incidents



4.3.25.1 Location and Extent

For this analysis a transportation incident is defined as an incident involving highway, air, or rail travel. Accidents involving hazardous materials are considered under Section 4.3.17 of this report. This analysis includes the location of all public airports, passenger and freight rail lines, and highways where major accidents are likely to occur.

Within Centre County, there are over 1,500 miles of roads and 489 bridges (PennDOT, 2024b; CCMPO, 2020a). Key freight routes include I-80, I-99, and US 322, SR-26, US 220. In 2023, PennDOT statistics indicated over 3.5 million daily vehicle miles traveled within Centre County (PennDOT 2024b). The Nittany and Bald Eagle Railroad serves the Bald Eagle Valley and Bellefonte area, for a total track length of 60 miles. There is a potential for major accidents on any of these roads, bridges or railways.

There are eight airports within the jurisdiction of Centre County. Only State College Regional Airport is used by commercial airlines, the other four are private. Numerous major air traffic routes for the northern United States also pass over Centre County. Figure 4.3.23-1 illustrates the major transportation systems in the County while Figure 4.3.23.2 shows the traffic volume on key roadways.

4.3.25.2 Range of Magnitude

At a minimum, transportation accidents can result in damage to the vehicles and minor injuries to passengers and drivers. At worst, significant transportation incidents can result in death or serious injury or extensive property loss or damage coupled with business interruptions and hours of congestion. Road and railway accidents in particular have the potential to result in hazardous materials releases if the vehicle involved in an accident is hauling hazardous materials. The expected impacts of transportation incidents are amplified by the fact that there is often little warning of accidents.

The worst-case scenario for a transportation incident impacting Centre County would be a road accident which results in a hazardous material spill in a densely population area, such as near the Penn State University campus. Such an event would constitute an immediate health hazard to the university population and require an evacuation of campus.

The potential impacts of transportation incidents on community lifelines are as follows:

Table 4.3.25-1: Most Likely Lifelines Impacted by Transportation Incidents

LIFELINE	NOTES
	Direct harm to the community, including drivers, bicyclists, and pedestrians.
	Medical personnel might be needed due to the significant risk of injury and death that transportation incidents represent.
	Potential negative consequences of incidents occurring while transporting these materials.

Figure 4.3.25-1: Centre County Transportation Systems, 2024

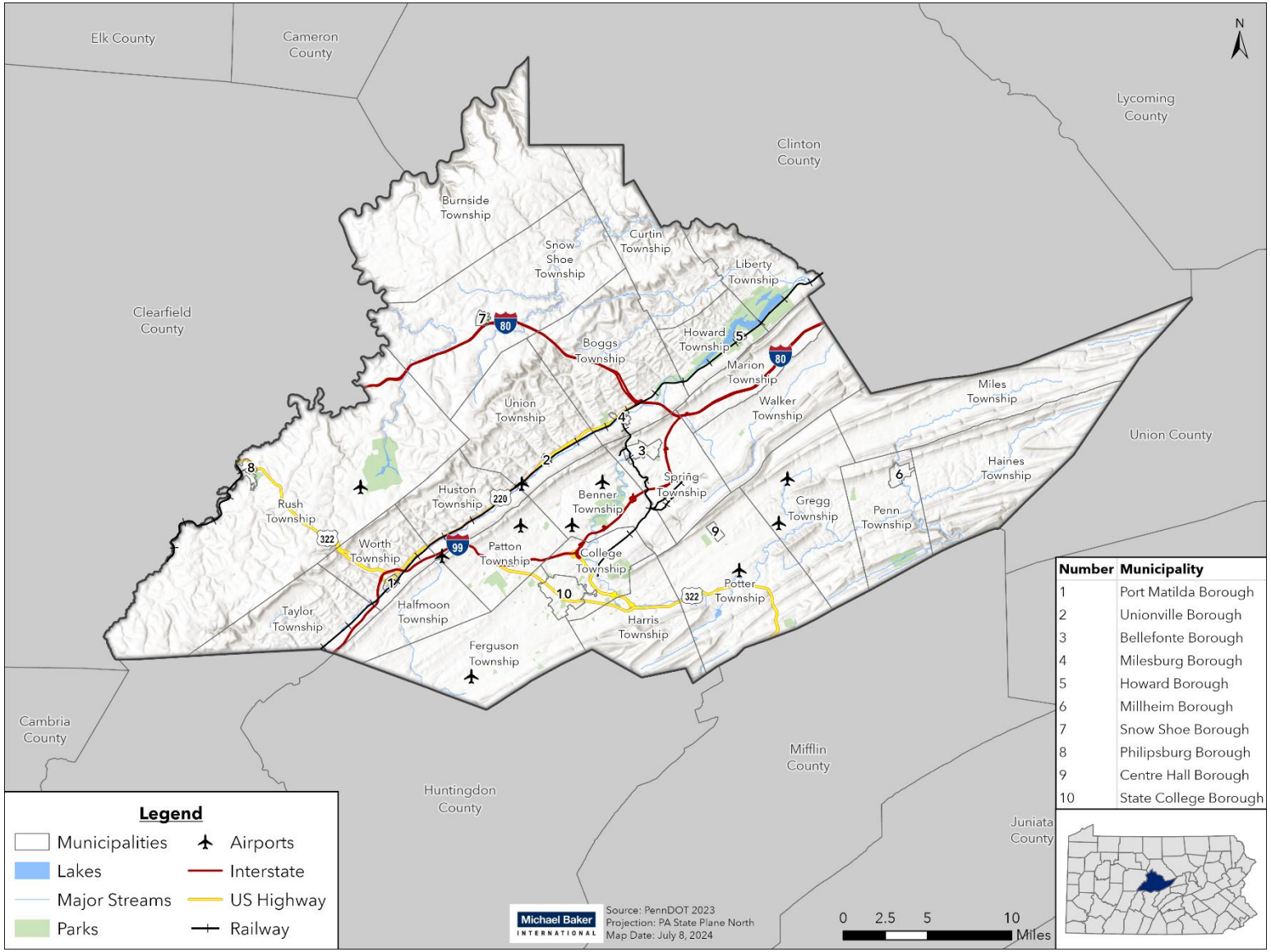
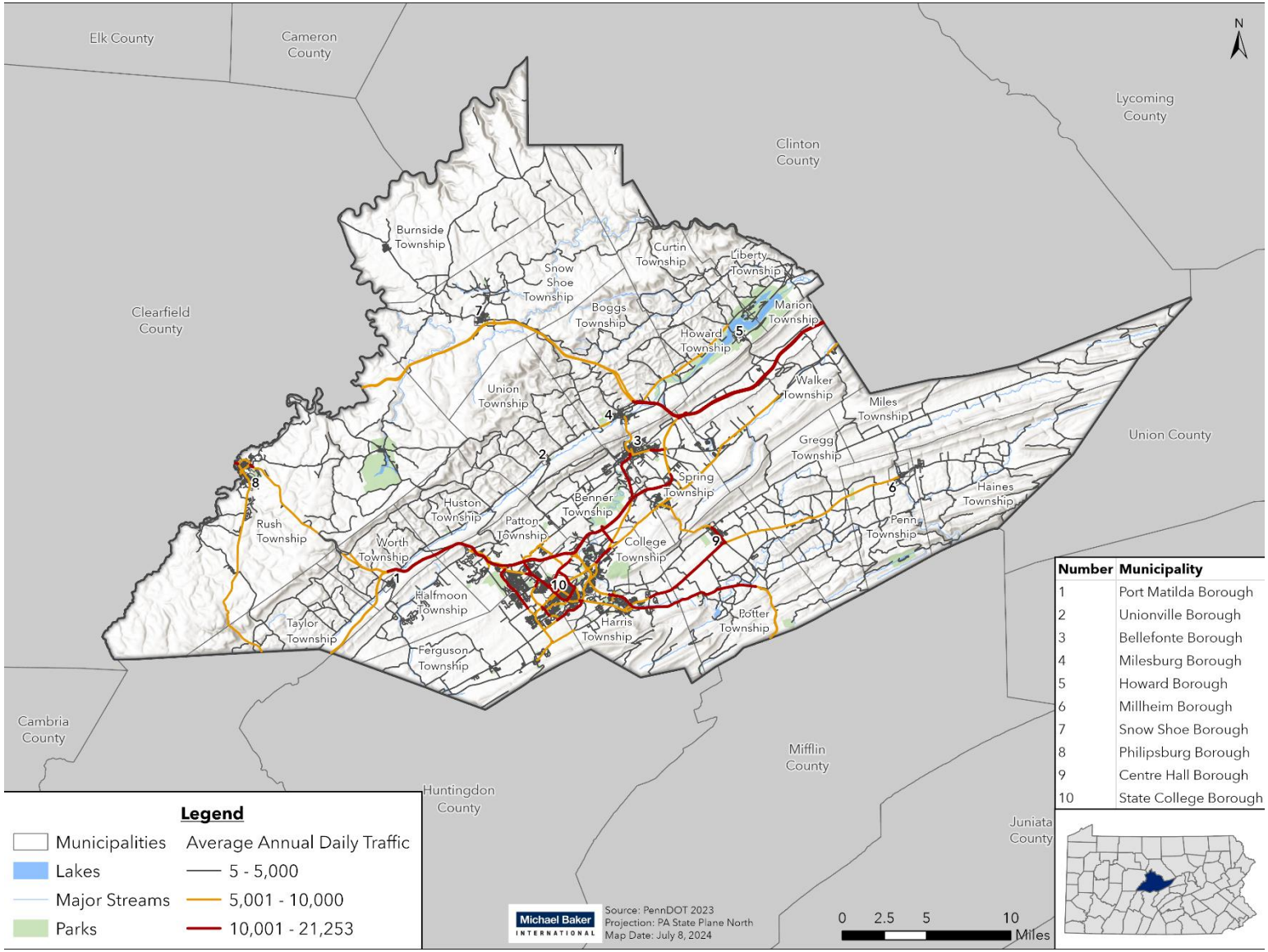


Figure 4.3.25-2: Centre County Traffic Volume on Key Roadways, 2024



4.3.25.3 Past Occurrence

Vehicle crashes continues to be a risk throughout the County. PennDOT statistics for reportable vehicle crashes in Centre County are shown in Table 4.3.23-2.

Table 4.3.25-2: Reportable Traffic Crash Data, 2009-2019 (PennDOT, 2023).

YEAR	REPORTABLE CRASHES	# FATAL CRASHES	# INJURY CRASHES
2009	1,262	12	618
2010	1,208	11	621
2011	1,320	18	618
2012	1,287	13	596
2013	1,242	11	557
2014	1,210	11	552
2015	1,301	15	577
2016	1,311	20	558
2017	1,248	15	503
2018	1,217	12	532
2019	1,189	1	493
2020	889	14	36
2021	1,041	10	49
2022	1,124	18	44
2023	1,024	15	51

Figure 4.3.23-3 shows the density of transportation crashes throughout Centre County. Red and yellow areas show roadways where the most crashes occurred between 2021 and 2024. In Centre County, most accidents occur along Routes I-80 and I-99, and SR 322. Crashes are also densely concentrated around the more populated communities in the southern portion of the County. Municipalities in the Centre Region such as College Borough, Ferguson Township, and State College Borough have areas with dense incidents of transportation crashes.

Pedestrian accidents remain a noted concern. Reviewing incident data from the last five years, it appears that the number of annual pedestrian injuries has roughly stayed the same since the last plan in 2021 (ranging from 32-49 incidents) (see Table 4.3.23-2).

Figure 4.3.25-3: Centre County Transportation Crash Density, 2023

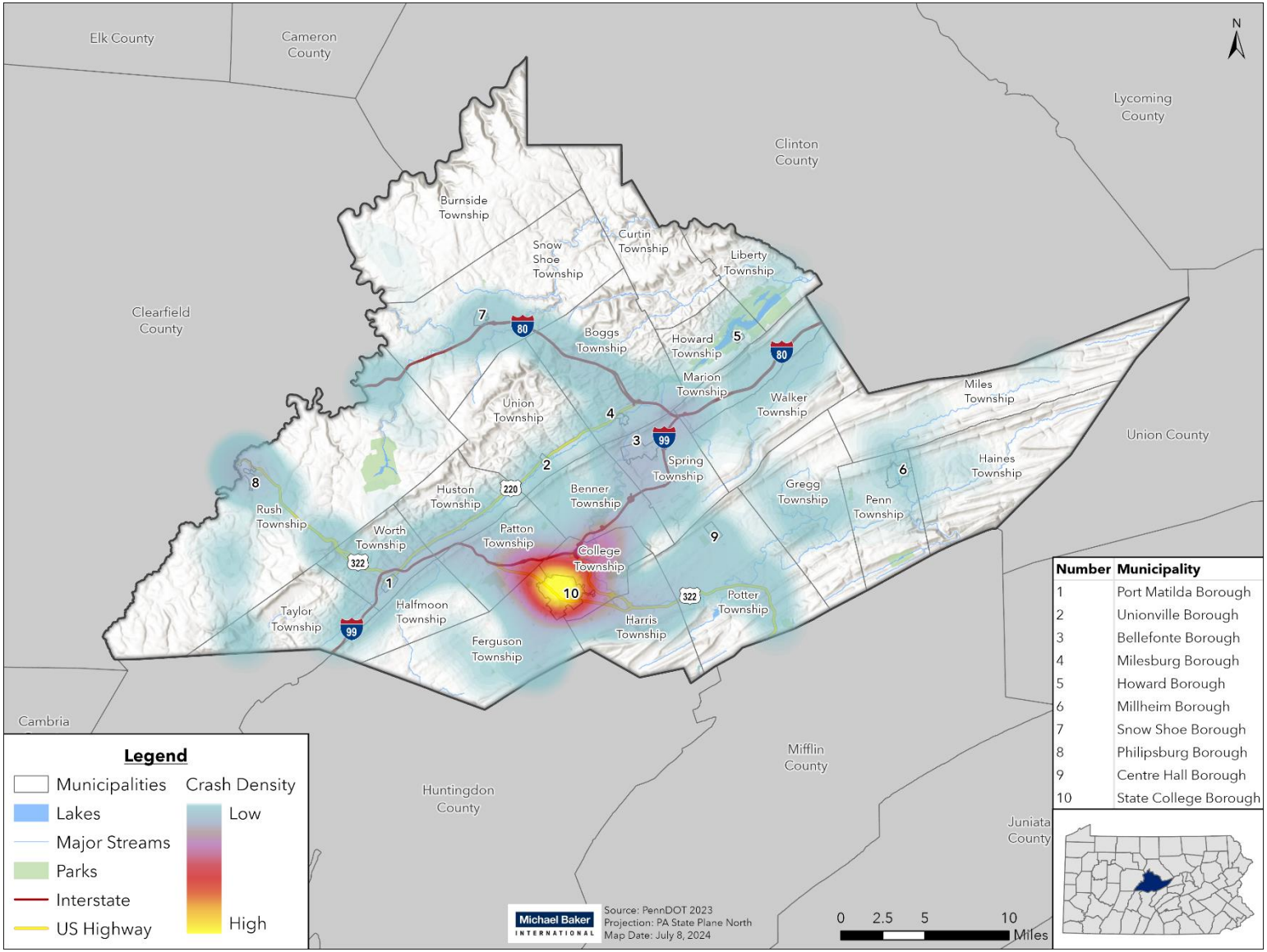


Table 4.3.25-3: Total Pedestrian Deaths and Injuries in Centre County by Age Group 2009-2023 (PennDOT, 2024).

YEAR	TOTAL PEDESTRIAN DEATHS	AGE 0-4		AGE 5-9		AGE 10-14		AGE 15-59		AGE 60+	
		DEATH	INJURY	DEATH	INJURY	DEATH	INJURY	DEATH	INJURY	DEATH	INJURY
2009	3	0	1	0	1	0	1	3	45	0	1
2010	1	0	0	0	1	0	1	0	40	1	1
2011	1	0	0	0	0	0	3	0	34	1	4
2012	0	0	1	0	0	0	0	0	44	0	3
2013	1	0	1	0	0	0	1	1	31	0	5
2014	2	0	1	1	0	0	0	1	38	0	3
2015	1	0	0	0	0	1	2	0	23	0	7
2016	3	0	0	0	2	0	1	1	38	2	2
2017	1	0	0	0	0	1	2	0	23	0	7
2018	0	0	0	0	0	0	0	0	44	0	4
2019	0	0	0	0	0	0	0	0	39	0	9
2020	0	0	0	0	0	0	1	2	18	0	2
2021	0	0	0	0	0	0	1	0	15	0	4
2022	1	0	0	0	0	0	2	2	20	1	4
2023	1	0	0	0	0	0	1	2	23	1	8

Forty-five (45) transportation incidents and/or incidents were also identified in Centre County OES's incident log from January 2024 through August 2024. While this is not a comprehensive source of all incidents in Centre County, it provides an inventory of events where the OES has been involved. Table 4.3.23-4 provides details on incidents reported in 2024. As shown in the table, incidents have involved aircrafts and railroad, as well as motor vehicles or trucks. Additionally, many of the accidents involving trucks resulted in the release of hazardous materials.

Table 4.3.25-4: Transportation Incidents Recorded in Centre County OES Incident Log January through August 2024 (Centre County EMA, 2024)

DATE	TYPE	INCIDENT	LOCATION
01/01/24	Transportation	Vehicle accident with hazards	Rush Township
01/06/24	Transportation	Vehicle into a house	Ferguson Township
01/06/24	Transportation	Vehicle into the median	Boggs Township
01/15/24	Transportation	Vehicle accident with entrapment	Walker Township
01/16/24	Transportation	Refer truck off the highway into the woods	Rush Township
01/16/24	Transportation	TT off the highway	Marion Township
01/16/24	Transportation	Vehicle accident involving two TTs	Snow Shoe Township
01/16/24	Transportation	Three vehicle accident on the bridge	Patton Township
01/16/24	Transportation	Vehicle accident involving two TTs	Marion Township
01/17/24	Transportation	TT off the roadway	Snow Shoe Township
01/18/24	Transportation	Vehicle into a house	Patton Township
01/20/24	Transportation	Vehicle slid on ice. It is in the median	Snow Shoe Township
01/22/24	Transportation	Large vehicle fire	Marion Township
02/10/24	Transportation	TT over the embankment	Rush Township
02/17/24	Transportation		Boggs Township
03/07/24	Transportation	In flight emergency-on door on aircraft	Benner Township
03/12/24	Transportation	TT rollover in the intersection	Benner Township
03/29/24	Transportation	TT accident with entrapment and road closure	Taylor Township
03/29/24	Transportation	In flight emergency - landing gear won't descend	Benner Township
04/02/24	Transportation	Vehicle accident with road closure	Taylor Township
04/04/24	Transportation	TT on fire. Hauling fertilizer	Boggs Township
04/09/24	Transportation	Vehicle accident involving a school bus. No injuries reported.	Bellefonte Borough
04/11/24	Transportation	TT rollover	Spring Township

Table 4.3.25-4: Transportation Incidents Recorded in Centre County OES Incident Log January through August 2024 (Centre County EMA, 2024)

DATE	TYPE	INCIDENT	LOCATION
04/26/24	Transportation	Vehicle accident with road closure. One fatality reported.	Worth Township
05/02/24	Transportation	Accident involving a train and dump truck. The dump truck was crossing the tracks and was hit by the approaching train. One injury was reported.	Huston Township
05/02/24	Transportation	Vehicle accident with road closure. One fatality reported.	College Township
05/11/24	Transportation	Vehicle accident with fire and entrapment	Centre Hall Borough
05/15/24	Transportation	In flight emergency-on door on aircraft	Benner Township
05/19/24	Transportation	Vehicle accident with hazards. Pole and wires down. Road closure.	Marion Township
05/29/24	Transportation	Vehicle accident with entrapment. One fatality reported.	Rush Township
05/29/24	Transportation	TT fire with road closure	Boggs Township
05/30/24	Transportation	Vehicle accident with hazards. There is less than 10 gallons of fuel spilled.	Union Township
06/09/24	Transportation	Vehicle accident with entrapment.	Bellefonte Borough
06/10/24	Transportation	TT overturned with road closure	Spring Township
06/12/24	Transportation	Vehicle accident involving overturned TT and pick up with one fatality	Harris Township
06/15/24	Transportation	Vehicle accident with power pole damage and road closure.	Marion Township
07/17/24	Transportation	Vehicle accident with hazards	Benner Township
07/19/24	Transportation	Vehicle accident with hazards. TT ran over debris causing fuel tank to leak.	Mount Nittany Expressway
07/27/24	Transportation	In flight emergency	Benner Township
08/02/24	Transportation	Truck hauling a horse trailer rolled over.	Rush Township
08/03/24	Transportation	Vehicle accident	Benner Township
08/04/24	Transportation	In flight emergency. Airplane losing altitude.	Benner Township
08/21/24	Transportation	Vehicle accident with entrapment and fire	Ferguson Township
08/26/24	Transportation	Motorcycle vs. car accident with one fatality	College Township

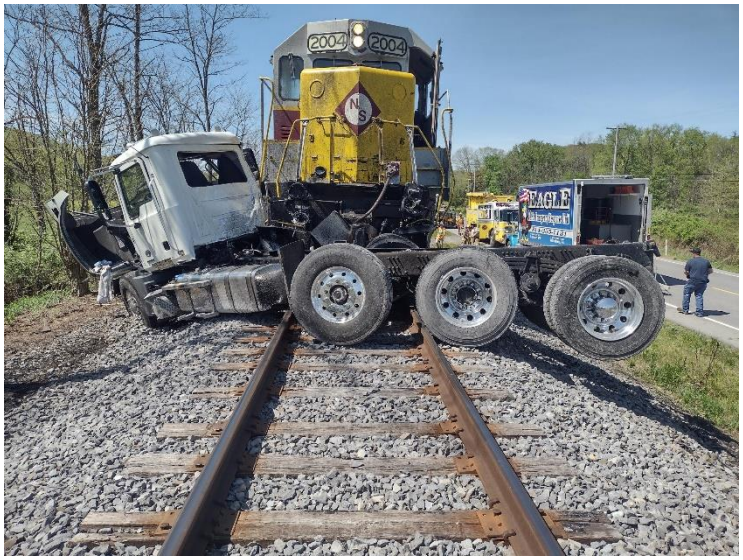


Figure 4.3.25-4: A Train Collides with a Dump Truck in Huston Township, May 2024



Figure 4.3.25-5: A Tractor Trailer Accident in Boggs Township, November 2024

4.3.25.4 Future Occurrence

Growth in the urbanized area of Centre County fueled by Penn State University and by increasing commercial business and enterprises with related housing growth has also contributed to large increases in traffic on the major roads serving commuter traffic from Centre County and the surrounding counties. The number of transportation related accidents is expected to increase with this projected growth. Recognizing the changing transportation network within the County and the steadily growing transportation volume, the number of accidents and resulting deaths, injuries, environmental impacts and property damages are expected to rise. The expected increases in transportation related responses require specialized training and equipment to be maintained at a high level of preparedness. The future occurrence of transportation incidents can be considered *highly likely*, according to the Risk Factor Methodology (see Table 4.4-1).

4.3.25.5 Vulnerability Assessment

A transportation-related incident can occur on any stretch of road in Centre County. However, severe accidents are more likely on the County's highways, which experience heavier traffic volumes including heavy freight vehicles. The combination of high traffic volume, severe winter weather in the County and large numbers of hazardous materials haulers increase the chances of traffic accidents occurring. Accidents may also occur on any rail line or air flight path.

Because of the widespread transportation network in Centre County, a large number of structures are exposed to the threat of transportation incidents. Tables 4.3.23-4, 4.3.23-5, and 4.3.23-6 show the structures, critical facilities (excluding oil and gas wells), and populations vulnerable to transportation incidents on roads, railroads, and near airports in Centre County. No conventional or unconventional oil and gas wells are in areas vulnerable to transportation incidents.

The communities most at risk are Unionville and Port Matilda Boroughs with 100 percent of structures located within 0.25 miles of a major highway, active rail line and airport. Additionally, 100 percent of critical facilities in Port Matilda Borough, Huston Township and Milesburg Borough are located in areas vulnerable to transportation incidents on roads, railroads, and near airports. Almost all communities in Centre County have a significant percentage of their population living less than 0.25 miles from a major highway, rail line or airport as shown in Table 4.3.23-7.

Table 4.3.25-5: Structures Vulnerable to Transportation Incidents, 2024

MUNICIAPLITY	TOTAL STRUCTURES	STRUCTURES WITHIN 0.25 MILES OF MAJOR HIGHWAY	PERCENT STRUCTURES WITHIN 0.25 MILES OF MAJOR HIGHWAY	STRUCTURES WITHIN 0.25 MILES OF ACTIVE RAIL LINE	PERCENT STRUCTURES WITHIN 0.25 MILES OF ACTIVE RAIL LINE	TOTAL STRUCTURES WITHIN 5 MILES OF AIRPORT	PERCENT STRUCTURES WITHIN 5 MILES OF AIRPORT
Bellefonte Borough	3,608	431	12%	2,158	60%	3,608	100%
Benner Township	4,185	327	8%	506	12%	4,185	100%
Boggs Township	3,300	1,483	45%	1,413	43%	3,300	100%
Burnside Township	753	-	0%	-	0%	7	1%
Centre Hall Borough	1,006	-	0%	-	0%	1,006	100%
College Township	6,214	3,983	64%	1,908	31%	6,214	100%
Curtin Township	1,055	-	0%	-	0%	390	37%
Ferguson Township	9,125	1,219	13%	682	7%	9,125	100%
Gregg Township	3,131	-	0%	-	0%	3,131	100%
Haines Township	2,580	-	0%	-	0%	2,065	80%
Halfmoon Township	2,148	19	1%	-	0%	2,148	100%
Harris Township	3,803	2,928	77%	-	0%	3,803	100%
Howard Borough	587	-	0%	587	100%	587	100%
Howard Township	1,141	-	0%	514	45%	1,141	100%
Huston Township	1,594	837	53%	818	51%	1,594	100%
Liberty Township	2,430	-	0%	669	28%	1,530	63%
Marion Township	1,346	1,087	81%	-	0%	1,346	100%
Miles Township	2,770	-	0%	-	0%	2,205	80%
Milesburg Borough	859	801	93%	859	100%	859	100%
Millheim Borough	840	-	0%	-	0%	840	100%
Patton Township	6,567	4,502	69%	1,850	28%	6,567	100%

Table 4.3.25-5: Structures Vulnerable to Transportation Incidents, 2024

MUNICIAPLITY	TOTAL STRUCTURES	STRUCTURES WITHIN 0.25 MILES OF MAJOR HIGHWAY	PERCENT STRUCTURES WITHIN 0.25 MILES OF MAJOR HIGHWAY	STRUCTURES WITHIN 0.25 MILES OF ACTIVE RAIL LINE	PERCENT STRUCTURES WITHIN 0.25 MILES OF ACTIVE RAIL LINE	TOTAL STRUCTURES WITHIN 5 MILES OF AIRPORT	PERCENT STRUCTURES WITHIN 5 MILES OF AIRPORT
Penn Township	1,786	-	0%	-	0%	1,786	100%
Philipsburg Borough	1,811	1,467	81%	1,548	85%	1,811	100%
Port Matilda Borough	458	458	100%	458	100%	458	100%
Potter Township	4,648	1,164	25%	-	0%	4,648	100%
Rush Township	4,587	1,005	22%	619	13%	4,549	99%
Snow Shoe Borough	595	463	78%	-	0%	595	100%
Snow Shoe Township	2,677	337	13%	-	0%	2,324	87%
Spring Township	6,153	1,476	24%	4,047	66%	6,153	100%
State College Borough	7,332	5,245	72%	573	8%	7,332	100%
Taylor Township	1,281	160	12%	334	26%	1,273	99%
Union Township	1,865	692	37%	617	33%	1,865	100%
Unionville Borough	264	264	100%	264	100%	264	100%
Walker Township	4,311	85	2%	-	0%	4,311	100%
Worth Township	1,059	594	56%	234	22%	1,059	100%
Total	**97,869**	**31,027**	**32%**	**20,658**	**21%**	**94,079**	**96%**

Table 4.3.25-6: Critical Facilities Vulnerable to Transportation Incidents, 2024

MUNICIPALITY	TOTAL CRITICAL FACILITIES	CFS WITHIN 0.25 MILES OF MAJOR HIGHWAY	PERCENT CFS WITHIN 0.25 MILES OF MAJOR HIGHWAY	CFS WITHIN 0.25 MILES OF ACTIVE RAIL LINE	PERCENT CFS WITHIN 0.25 MILES OF ACTIVE RAIL LINE	CFS WITHIN 5 MILES OF AIRPORT	PERCENT CFS WITHIN 5 MILES OF AIRPORT
Bellefonte Borough	17	16	94%	7	41%	16	94%
Benner Township	26	10	38%	3	12%	22	85%
Boggs Township	9	7	75%	6	67%	7	78%
Burnside Township	3	1	33%	0	0%	0	0%
Centre Hall Borough	4	4	100%	0	0%	4	100%
College Township	44	30	68%	6	14%	36	82%
Curtin Township	2	1	50%	1	50%	0	0%
Ferguson Township	27	10	37%	0	0%	16	59%
Gregg Township	10	8	80%	1	10%	10	100%
Haines Township	7	2	29%	0	0%	0	0%
Halfmoon Township	5	1	20%	0	0%	5	100%
Harris Township	8	6	75%	0	0%	0	0%
Howard Borough	4	4	100%	1	25%	0	0%
Howard Township	1	0	0%	0	0%	1	100%
Huston Township	1	1	100%	1	100%	1	100%
Liberty Township	5	3	60%	1	20%	0	0%
Marion Township	3	3	100%	0	0%	0	0%
Miles Township	15	8	53%	0	0%	1	7%
Milesburg Borough	3	3	100%	2	67%	3	100%
Millheim Borough	4	4	100%	0	0%	0	0%
Patton Township	22	16	73%	1	5%	22	100%
Penn Township	15	11	71%	5	33%	7	47%

Table 4.3.25-6: Critical Facilities Vulnerable to Transportation Incidents, 2024

MUNICIPALITY	TOTAL CRITICAL FACILITIES	CFS WITHIN 0.25 MILES OF MAJOR HIGHWAY	PERCENT CFS WITHIN 0.25 MILES OF MAJOR HIGHWAY	CFS WITHIN 0.25 MILES OF ACTIVE RAIL LINE	PERCENT CFS WITHIN 0.25 MILES OF ACTIVE RAIL LINE	CFS WITHIN 5 MILES OF AIRPORT	PERCENT CFS WITHIN 5 MILES OF AIRPORT
Philipsburg Borough	9	8	89%	5	56%	0	0%
Port Matilda Borough	4	4	100%	4	100%	4	100%
Potter Township	15	7	47%	1	7%	14	93%
Rush Township	26	11	42%	0	0%	8	31%
Snow Shoe Borough	2	2	100%	0	0%	0	0%
Snow Shoe Township	8	4	50%	1	13%	0	0%
Spring Township	19	12	63%	6	32%	14	74%
State College Borough	36	25	69%	0	0%	32	89%
Taylor Township	1	1	100%	0	0%	0	0%
Union Township	5	4	80%	4	80%	5	100%
Unionville Borough	0	0	0%	0	0%	0	0%
Walker Township	13	6	46%	0	0%	8	62%
Worth Township	2	2	100%	1	50%	2	100%
Total	**364**	**228**	**63%**	**56**	**15%**	**230**	**63%**

Table 4.3.25-7: Population Vulnerable to Transportation Incidents

MUNICIPALITY	ESTIMATED 2020 POPULATION	POPULATION WITHIN 0.25 MILES OF MAJOR HIGHWAY	PERCENT POPULATION WITHIN 0.25 MILES OF MAJOR HIGHWAY	POPULATION WITHIN 0.25 MILES OF ACTIVE RAIL LINE	PERCENT POPULATION WITHIN 0.25 MILES OF ACTIVE RAIL LINE	TOTAL POPULATION WITHIN 5 MILES OF AIRPORT	PERCENT POPULATION WITHIN 5 MILES OF AIRPORT
Bellefonte Borough	6,102	1,151	19%	3,717	61%	6,102	100%
Benner Township	8,963	2,789	31%	5,472	61%	8,963	100%
Boggs Township	2,714	1,798	66%	1,527	56%	2,714	100%
Burnside Township	411	-	0%	-	0%	88	21%
Centre Hall Borough	1,269	-	0%	-	0%	1,269	100%
College Township	10,718	8,365	78%	3,761	35%	10,718	100%
Curtin Township	494	-	0%	-	0%	337	68%
Ferguson Township	18,949	5,729	30%	3,850	20%	18,949	100%
Gregg Township	2,261	-	0%	-	0%	2,261	100%
Haines Township	1,649	-	0%	-	0%	1,472	89%
Halfmoon Township	2,790	196	7%	130	5%	2,790	100%
Harris Township	5,913	5,502	93%	-	0%	5,913	100%
Howard Borough	687	-	0%	687	100%	687	100%
Howard Township	875	-	0%	383	44%	875	100%
Huston Township	1,317	1,056	80%	1,056	80%	1,317	100%
Liberty Township	1,815	-	0%	791	44%	1,354	75%
Marion Township	1,182	1,106	94%	-	0%	1,182	100%
Miles Township	1,998	-	0%	-	0%	1,791	90%
Milesburg Borough	1,084	1,084	100%	1,084	100%	1,084	100%
Millheim Borough	831	-	0%	-	0%	831	100%
Patton Township	15,650	13,480	86%	8,681	55%	15,650	100%

Table 4.3.25-7: Population Vulnerable to Transportation Incidents

MUNICIPALITY	ESTIMATED 2020 POPULATION	POPULATION WITHIN 0.25 MILES OF MAJOR HIGHWAY	PERCENT POPULATION WITHIN 0.25 MILES OF MAJOR HIGHWAY	POPULATION WITHIN 0.25 MILES OF ACTIVE RAIL LINE	PERCENT POPULATION WITHIN 0.25 MILES OF ACTIVE RAIL LINE	TOTAL POPULATION WITHIN 5 MILES OF AIRPORT	PERCENT POPULATION WITHIN 5 MILES OF AIRPORT
Penn Township	1,203	-	0%		0%	1,203	100%
Philipsburg Borough	2,772	2,522	91%	2,670	96%	2,772	100%
Port Matilda Borough	578	578	100%	578	100%	578	100%
Potter Township	3,580	1,279	36%		0%	3,580	100%
Rush Township	3,513	1,241	35%	710	20%	3,513	100%
Snow Shoe Borough	670	617	92%	-	0%	670	100%
Snow Shoe Township	1,621	235	14%	-	0%	1,586	98%
Spring Township	7,980	4,177	52%	6,557	82%	7,980	100%
State College Borough	40,605	28,248	70%	1,365	3%	40,605	100%
Taylor Township	848	351	41%	478	56%	848	100%
Union Township	1,363	923	68%	923	68%	1,363	100%
Unionville Borough	271	271	100%	271	100%	271	100%
Walker Township	4,599	590	13%	-	0%	4,599	100%
Worth Township	725	697	96%	418	58%	725	100%
Total	**207,619**	**184,607**	**89%**	**44,041**	**21%**	**168,072**	**81%**

4.3.25.6 Equity in Vulnerable Communities

Lower-income communities may be at a higher risk of transportation incidents as infrastructure may be outdated or poorly maintained, increasing the risk of severe outcomes from transportation incidents. This includes State College Borough, Bellefonte Borough, and Ferguson Township as they have areas with the highest populations below the poverty level. Rural areas may also have disproportionate effects due to their secluded locations which could affect the access to timely and effective emergency response services. Areas such as State College Borough, Milheim Borough, Miles Township, Haines Township, Penn Township, and Millhiem Borough with higher shares of households without vehicle access may be more vulnerable from a pedestrian perspective.

4.3.26 Urban Fire and Explosion



4.3.26.1 Location and Extent

Urban fire and explosion involves a structure or property fire within an urban or developed area. For hazard mitigation purposes, major urban fires involving large buildings and/or multiple properties are of primary concern. Statewide, this hazard occurs in the denser, more urbanized areas and occurs most often in residential structures (US Fire Administration, 2019). Urban fires can more easily spread from building to building in these denser areas.

Urban fires and explosions can be triggered or exacerbated by other disaster events such as floods, storms, drought, transportation incidents, hazardous materials releases, criminal activity such as arson, and terrorism. Urban fires have the potential to cause extensive damage to residential, commercial, or public property. Damage ranges from minor smoke and/or water damage to the destruction of buildings. People are often displaced for several months to years depending on the magnitude of the event. Urban fires and explosions can also cause injuries and death; in Pennsylvania, the fire mortality rate is approximately 17.2 deaths per million residents, or about 224 fire-related deaths per year. This is the 21st highest fire mortality rate in the nation and is higher than the national average of 13.0 deaths per million residents (US Fire Administration, 2021).

There are additional economic consequences related this hazard. Urban fires and explosions may result in lost wages due to temporarily or permanently closed businesses, destruction and damage involving business and personal assets, loss of tax base, recovery costs, and lost investments in destroyed property.

4.3.26.2 Range of Magnitude

The effects of a major urban fire include minor to significant property damage, loss of life, and residential or business displacement. Explosions are extremely rapid releases of energy that usually generate high temperatures and often lead to fires. The risk of severe explosions can be reduced through careful management of flammable and explosive hazardous materials (FEMA, 1997). The impacts of urban fire and explosion events vary based on the size of the incident and the population and structure where it occurs. Although most fires are small structural fires, the cumulative effect of these small incidents can be great in terms of property damage and lives lost. Many small incidents have the potential for a fire disaster if early warning and fire department services are not available. The secondary effects of urban fire events relate to the ability of public, private, and non-profit entities to provide post-incident relief.

Human services agencies (community support programs, health and medical services, public assistance programs and social services) can be affected by urban fire and explosion events as well. Effects may consist of physical damage to facilities and equipment, disruption of emergency communications, loss of health and medical facilities and supplies, and an overwhelming load of victims who are suffering from the effects of the urban fire, including loss of their home or place of business.



Figure 4.3.26-1: 2009 Fire at the Cadillac Building in Downtown Bellefonte

A significant urban fire event occurred in 2005 in Phillipsburg Borough. Fire damaged a total of seven businesses and 30 apartments. This six-alarm blaze involved possible entrapment of residences, fire fighters succumbing to the heat during response, and rescue operations. The fire burned for more than fifteen hours. Five fire fighters were transported to Philipsburg Area Hospital for smoke inhalation and heat exhaustion. All fire fighters were treated and released. One apartment resident suffered smoke inhalation and a second resident suffered burns to the face. The residents were also treated and released at the Philipsburg Area Hospital. A total of 24 fire and four ambulance companies responded to this incident, considered a worst-case scenario for the County.



Figure 4.3.26-2: Arson Fire at the Hotel Do De in Bellefonte in September 2012 (Centre Daily Times, 2012)

The potential impacts of urban fire and explosion on community lifelines are as follows:

Table 4.3.26-1: Most Likely Lifelines Impacted by Urban Explosion and Fire

LIFELINES	NOTES
Safety and Security	Government personnel will need to respond where community safety is threatened.

Table 4.3.26-1: Most Likely Lifelines Impacted by Urban Explosion and Fire

LIFELINES	NOTES
	Shelter is at risk as fires and explosions have a direct impact on houses and other forms of shelter.
	Medical personnel may be needed for response and recovery.

4.3.26.3 Past Occurrence

Centre County experiences at least two major fires annually involving a significant number of the County's fire companies. Some municipalities, such as Bellefonte Borough, have aging housing stock and high-fire load, and experience a major loss fire annually. On December 22, 2009, an overnight blaze damaged the 95-year-old Cadillac Building on the corner of Allegheny and Bishop Streets in historic downtown Bellefonte, displacing the residents of 18 apartments, but injuring no one. An image of this fire is shown in Figure 4.3.24-1. This building became Bellefonte's fifth historic structure burnt by fire in five years. Blazes destroyed The Academy and the Bush House in 2004 and 2006, respectively. Two mansions, Victorian Manor in 2007 and Valentine House in 2008, survived extensive damage. A fire severely damaged another historic structure, the Hotel Do De, on September 9, 2012, shown in Figure 4.3.24-2. The fire, ruled as arson, damaged the Garman Theater, which is located next to the Hotel Do De. The structure was occupied at the time, but no injuries occurred.

Centre County OES maintains an incident log. While this is not a comprehensive source of all structure fires in Centre County, it provides a listing of incidents that the OES has been involved with between 2021 and 2024. Table 4.3.24-1 lists 20 structure fires recorder in the incident log.

Table 4.3.26-2: Structure Fires Recorded in Centre County OES Incident Log (Centre County EMA, 2024)

DATE	TYPE	INCIDENT	LOCATION
01/19/21	Industrial Fire	HRI Hanson Quarry, Stone plant	Boggs Township
07/07/21	Building Fire	Large commercial fire, restaurant - apartments	Boggs Township
01/13/22	Fire	Barn Fire	Boggs Township
02/09/22	Building Fire	Apt. Bldg. Fire - 35 residents	Bellefonte Borough

Table 4.3.26-2: Structure Fires Recorded in Centre County OES Incident Log (Centre County EMA, 2024)

DATE	TYPE	INCIDENT	LOCATION
04/06/22	Building Fire	Farm shop, equipment, fire-explosions	Union Township
11/30/22	Commercial Fire	Fire in Building 5 at St. Joseph's Institute of Rehabilitation. 30-50 persons were evacuated to an adjacent building.	Taylor Township
05/04/23	Fire	Large vehicle fire in the parking lot	College Township
06/13/23	Fire	Building fire	Potter Township
11/11/23	Fire	Dwelling fire with road closure	Spring Township
11/21/23	Fire	Store lost power with smoke in the ventilation vent	Snow Shoe Township
11/27/23	Fire	Small barn on fire. Animals still inside.	Miles Township
12/12/23	Fire	Fire started in the dumpster now spreading to the back of the building.	Patton Township
12/21/23	Fire	Dwelling fire with entrapment	Philipsburg Borough
01/08/24	Fire	Garbage truck fire	Marion Township
03/05/24	Fire	Dwelling fire with entrapment	Bellefonte Borough
04/14/24	Fire	Dwelling fire caused by a lightning strike	Walker Township
04/14/24	Fire	Dwelling fire caused by a lightning strike	Ferguson Township
05/21/24	School Fire	Fire on the roof and smoke in the building	Centre Hall Borough
07/26/24	Fire	Dwelling fire with road closure	Spring Township
08/21/24	Fire	Camper fire at Grange Fair	Centre Hall Borough

4.3.26.4 Future Occurrence

The future occurrence of urban fire and explosion events can be considered *possible*, according to the Risk Factor Methodology (see Table 4.4-1), with minor events

happening more frequently than major fires or explosions in the future. The greatest urban fire and explosion threats in Centre County are industrial fires and hazardous materials fires. While residential fires are more common, industrial fires have a potentially higher risk because of the possibility of there being flammable chemicals and a sustained fuel source at industrial sites. Areas with greater population density are also at a greater risk for fires.

4.3.26.5 Vulnerability Assessment

Areas where large buildings are located or where development is closely spaced are more vulnerable to urban fire and explosion events. In Centre County, the jurisdictions with the highest population densities (greater than 5,000 persons per square mile) include State College and Bellefonte Boroughs. In order to adequately assess vulnerability to urban fires and explosions, detailed information on the design specifications, specifically fire codes, used for the construction of individual buildings is required.

As of December 31, 2006, all communities in Pennsylvania are required to comply with the Uniform Construction Codes. This includes requirements to comply with both the International Fire Code and the International Wildland Urban Interface Code. The adoption and enforcement of these codes will likely decrease the overall vulnerability of structures in Centre County. However, these regulations will only affect new construction, as well as additions and renovations to existing structures. Older buildings that do not meet the criteria established in these modern fire codes will continue to remain vulnerable to urban fire and explosion events.

4.3.26.6 Equity in Vulnerable Communities

Municipalities with an older housing stock may be at a higher risk for urban fires and explosions. Low-income communities oftentimes live in neighborhoods where inadequate building maintenance is common or near industrial areas due to historic zoning laws. This includes State College Borough, Bellefonte Borough, and Ferguson Township as they have areas with the highest populations below the poverty level. Residential areas in rural areas may also be at a heightened risk due to their seclusion affecting response times. Individuals with disabilities or limited mobility may face additional challenges during a fire or explosion. Ensuring that emergency services are equipped to assist people with diverse needs.

4.3.27 Utility Interruption



4.3.27.1 Location and Extent

Utility interruptions include any impairment of the functioning of telecommunication, gas, electric, water, or waste networks. Interruptions or outages occur because of geomagnetic storms, fuel or resources shortage, electromagnetic pulses, information technology failures, transmission facility or linear utility accident, and major energy, power, or utility failure. The focus of utility interruptions as a hazard lies in fuel, energy, or utility failure.

These kinds of interruptions rarely spontaneously occur on their own; this hazard is often secondary to other natural hazard events, particularly transportation incidents, lightning strikes, extreme heat or cold events, and coastal and winter storms. For example, severe thunderstorms or winter storms could bring down power lines and cause widespread disruptions in electricity service. Strong heat waves may result in rolling blackouts where power may not be available for an extended period. Local outages may be caused by traffic accidents or wind damage.

Utility interruptions and power failures can take place throughout the County. Centre County was previously served by Allegheny Power; however, this electric utility provider merged with FirstEnergy Corp. in 2011. First Energy Corp. consists of ten electric utility companies that served 6 million customers in Ohio, Pennsylvania, West Virginia, New Jersey, Maryland, and New York. Centre County's utility provider under First Energy Corp. is West Penn Power (FirstEnergy, 2020).

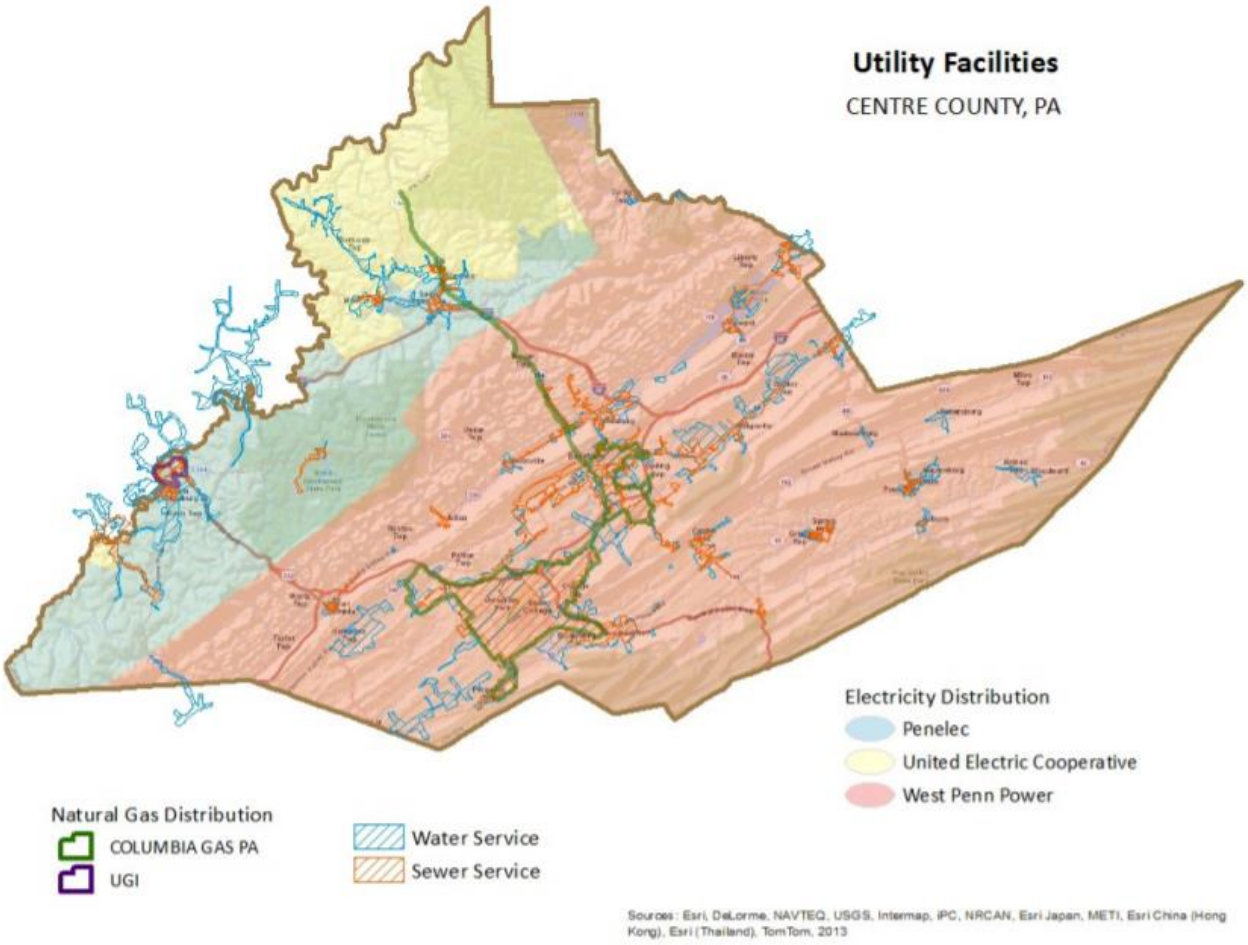
According to the 2022 5-year American Community Survey, in Centre County, 46.3% of housing units use electric heat, followed by 23.6% of homes using utility gas as their heat source (U.S. Census Bureau, 2022). As a result, an interruption in either of those utilities could affect a significant number of residents. Natural gas expansion continues to be at the forefront of infrastructure planning through the SEDA-COG Natural Gas Cooperative, of which Centre County is a member. Targeted areas for installing new natural gas pipeline include Centre Hall Borough, the industrial corridor in Boggs Township, and the Interstate 80 interchange for Snow Shoe (CCPCDO, 2019a). In addition, an increasing reliance on internet access and telecommunications could also impact a large number of residents at any given time.

There are 47 public/community water systems and 24 public/community sewer systems in Centre County. Nearly all of these systems are operated as an authority. Only a

handful of systems provide water and sewerage to multiple municipalities or are operated in-joint by multiple municipalities (CCPCDO, 2019a).

Figure 4.3.27-1 identifies utility facilities and services throughout Centre County. As information becomes more readily available for future Plan Updates, fiber optic lines and broadband data will also be considered as part of the utility facilities map.

Figure 4.3.27-1: Utility Facilities and Service Areas in Centre County (CCPCDO, 2019a)



4.3.27.2 Range of Magnitude

Most severe power failures or outages are regional events. With the loss of power, electric-powered equipment and systems will not be operational. Examples may include lighting; HVAC and ancillary support equipment; communication (i.e. public address systems, telephone, computer servers, and peripherals); ventilation systems; fire and security systems; refrigerators, sterilizers, trash compactors, office equipment; and medical equipment. This can cause food spoilage, loss of heat or air conditioning, basement flooding (sump pump failure), lack of light, loss of water (well pump failure), lack of phone service, or lack of internet service. These issues are often more of a

nuisance than a hazard but can cause damage or harm depending on the population affected and the severity of the outage.

The severity of a utility interruption can be compounded with extreme weather events, especially winter weather events. Interruptions can also be more severe for special needs populations that are dependent on electronic medical equipment. Utility interruptions can significantly hamper first responders in their efforts to provide aid in a compound disaster situation, especially with losses of telecommunications and wireless capabilities. Telecommunications interruptions will also hinder first responders' efforts. Additionally, an internet outage could be crippling to the economy, as many companies and government entities process payments and invoices electronically rather than with physical checks.

In a possible worst-case scenario in Centre County, a winter storm event could cause widespread power outages, leaving citizens without heat in the midst of subzero temperatures for several days. The power outage would also put elderly populations or others at risk of health problems due to the lack of heat and the inability to call for assistance or leave their homes. Power lines may also be difficult to repair because of the magnitude of the storm.

The potential impacts of utility interruption on the community lifelines are as follows:

Table 4.3.27-1: Most Likely Lifelines Impacted by Utility Interruption

LIFELINES	notes
	Government facilities may be impacted directly and the capability to administer services diminished.
	Water and electrical utilities in homes and potentially different aspects of the food supply chain will be impacted.
	Healthcare facilities may be impacted directly and therefore the capacity to deal with patients is diminished.
	Fuel usage may increase as a result of electricity no longer being available for an extended period of time.

4.3.27.3 Past Occurrence

Energy emergencies may be caused by nationwide shortages or localized supply problems. Centre County, like most of Pennsylvania, experienced problems in 1972-73 and again in 1976-77. During the 1972-73 incident, the County was particularly affected by heating oil shortages. Voluntary cutbacks in energy use helped ease the shortage. In 1976-77, the main problem was a gasoline shortage. This time voluntary cutbacks were insufficient, and an odd-even rationing plan was enforced. The County Emergency Management Agency designated fuel distributions for emergency and priority users.

In October 2009, it was estimated that 12,000 residents in Centre County were without power as falling trees and tree limbs caused as many as 350 separate "outages" during a snowstorm. Snow and wind events that can inflict severe tree damage have caused power disruptions in the past and minor power outages are anticipated to occur annually.

Centre County has experienced several occurrences of utility interruption in the past. Centre County OES maintains an incident log, which contains 6 events related to utility interruptions. While this log is not a comprehensive source of all incidents in Centre County, it provides an inventory of events that the OES has been involved with. As shown in Table 4.3.25-2, several power outages were countywide between 2021 and 2024.

Table 4.3.27-2: Utility Emergencies Recorded in Centre County OES Incident Log (Centre County EMA, 2024)

DATE	TYPE	DESCRIPTION	LOCATION
07/07/21	Severe Weather	High Winds, power outages, fatal -tree falling	Countywide
12/10/21	Wind Storms	Strong winds, power outages	Countywide
01/09/24	Hazardous Conditions	Tree and wires down. Power outage in the area.	Burnside Township
07/23/24	Fire	Alarms sounding with power outage	Patton Township
08/23/24	Power Outage	Truck had the bed up and pulled down West Penn Power, Verizon and Comcast lines down. Extended outage in the area.	Benner Pike
08/29/24	Flooding	The impact of this storm included flooded basements, flooded/closed roadways and extensive Power outages.	Penns Valley

4.3.27.4 Future Occurrence

Utility interruptions will continue to occur annually with minimal impact. Widespread utility interruption events usually occur approximately once every five years, usually as a

secondary effect of an extreme weather event. These interruptions should be anticipated, and first responders should be prepared during severe weather events. Research by the National Oceanic and Atmospheric Administration (NOAA) suggests that climate change may cause more extreme storms in Pennsylvania (Frankson et. al., 2017).

The State College region is expected to see large increases in precipitation and numbers of very hot and very cold days (Climate Central, 2019). These factors can increase the occurrence of hazards such as flooding, hurricanes and tropical storms, landslides, tornados and windstorms, wildfires, and winter storms. Impacts from any of these hazards can lead to utility interruption on a range of scales. Overall, the future probability of utility interruptions can be considered *likely* according to the Risk Factor Methodology (See Table 4.4-1).

Aging infrastructure also brings risk in the form of potential utility interruptions, particularly for places like Centre County with aging infrastructure. In many utility systems, significant portions of the equipment and facilities date from the growth periods of the 1950s and 1960s that followed World War II. As this equipment ages, it deteriorates from the constant wear and tear of service. Eventually, the equipment reaches a point at which it will either fail on its own or as a result of outside forces (storms, loads it was designed to handle but no longer can, etc.). These failures cause service interruptions and can require expensive emergency repairs. In addition, as repairs have taken place along transmission routes, there is often a mix of new and old equipment along the line; repair, not replacement is generally the choice to resolve an issue.

The wholesale replacement of a system is not a feasible solution for utility companies. This would require the interruption of services while the replacement occurs, as well as accessing the existing system (which may lay under roads, private property, or other inconvenient places). Utility companies face the challenge of managing the issue of the aging infrastructure. They are tasked with reducing the effects of aging equipment while also controlling the deterioration of the existing system as much as possible. This balance will be tenuous as transmission equipment continues to age and break down. These breakdowns will likely lead to more frequent utility disruptions as time goes by.

4.3.27.5 Vulnerability Assessment

All jurisdictions are vulnerable on some level to utility interruptions, but because this hazard often occurs in conjunction with other hazards, jurisdictions that have been identified as more vulnerable to winter storms, windstorms, tornado, flooding, and other natural hazard events may be more vulnerable to a utility interruption.

Emergency medical facilities, including retirement homes and senior centers are particularly vulnerable to power outages. While back-up power generators are often used at these facilities, loss of electricity may result in hot or cold temperatures for which elderly populations are particularly vulnerable. Appendix D provides a list of where those facilities are located in Centre County. Conservation and improved technology have resulted in more efficient use of energy sources. The increasing use of alternative fuel supplies, such as kerosene heaters, wood burning stoves, coal burners, etc., has also decreased our vulnerability to future shortages. However, severe weather extremes, accidents, labor strikes, terrorism, or nationwide shortages could cause significant energy shortage problems.

4.3.27.6 Equity in Vulnerable Communities

Utility interruptions can disproportionately affect vulnerable populations, including the elderly, individuals with disabilities, and those with chronic health issues who rely on electricity for medical equipment. Rush Township, Philipsburg Borough, Patton Township, Potter Township, Centre Hall Borough, and Gregg Township have the highest populations over 65 years of age. Adequate preparedness for these groups prioritizes these groups by ensuring that backup power systems, such as generators. Additionally, low-income communities often face challenges related to aging or poorly maintained infrastructure, which can increase the likelihood and duration of utility interruptions. Adequate mitigation should focus on improving infrastructure resilience.

4.4 HAZARD VULNERABILITY SUMMARY

4.4.1 Methodology

Ranking hazards helps communities set goals and priorities for mitigation based on their vulnerabilities. A Risk Factor (RF) is a tool used to measure the degree of risk for identified hazards in a particular planning area. The RF can also assist local community officials in ranking and prioritizing hazards that pose the most significant threat to a planning area based on a variety of factors deemed important by the planning team and other stakeholders involved in the hazard mitigation planning process. The RF system relies mainly on historical data, local knowledge, general consensus from the planning team, and information collected through development of the hazard profiles included in Section 4.3. The RF approach produces numerical values that allow identified hazards to be ranked against one another; the higher the RF value, the greater the hazard risk.

RF values were obtained by assigning varying degrees of risk to five categories for each of the hazards profiled in the HMP Update. Those categories include *probability, impact, spatial extent, warning time, and duration*. Each degree of risk was assigned a value ranging from one to four. The weighting factor is shown in Table 4.4-1. To calculate the RF value for a given hazard, the assigned risk value for each category was multiplied by the weighting factor. The sum of all five categories equals the final RF value, as demonstrated in the following example equation:

Risk Factor Value = [(Probability x .30) + (Impact x .30) + (Spatial Extent x .20) + (Warning Time x .10) + (Duration x .10)]

Table 4.4-1 summarizes each of the five categories used for calculating a RF for each hazard. According to the weighting scheme applied, the highest possible RF value is 4.0. In addition to the RF, a column on climate change impacts was added to summarize the anticipated impacts on the frequency, intensity, and duration of each hazard due to climate change. This mirrors the analysis done in the latest state plan update. Climate change ratings reflect what was done in the state plan and includes some considerations to findings that are specific to Centre County. More information can be found in hazard profiles.

Table 4.4-1: Summary of Risk Factor Approach

Risk Assessment Category	Degree of Risk			Weight Value
	Level	Criteria	Index	
PROBABILITY What is the likelihood of a hazard event occurring in a given year?	Unlikely	Less than 1% annual probability.	1	30%
	Possible	Between 1% and 49.9% annual probability.	2	
	Likely	Between 50% and 90% annual probability.	3	
	Highly Likely	Greater than 90% annual probability.	4	
IMPACT In terms of injuries, damage, or death, would you anticipate impacts to be minor, limited, critical, or catastrophic when a significant hazard event occurs?	Minor	Very few injuries, if any. Only minor property damage and minimal disruption on quality of life. Temporary shutdown of critical facilities.	1	30%
	Limited	Minor injuries only. More than 10% of property in affected area damaged or destroyed. Complete shutdown of critical facilities for more than one day.	2	
	Critical	Multiple deaths and injuries possible. More than 25% of property in affected area damaged or destroyed. Complete shutdown of critical facilities for more than one week.	3	
	Catastrophic	High number of deaths and injuries possible. More than 50% of property in affected area damaged or destroyed. Complete shutdown of critical facilities for 30 days or more.	4	
SPATIAL EXTENT How large of an area could be impacted by a hazard event? Are impacts localized or regional?	Negligible	Less than 1% of area affected.	1	20%
	Small	Between 1% and 10.9% of area affected.	2	
	Moderate	Between 11% and 25% of area affected.	3	
	Large	Greater than 25% of area affected.	4	
WARNING TIME Is there usually some lead time associated with the hazard event?	> 24 hours	Self-defined	1	10%
	12 to 24 hours	Self-defined	2	
	6 to 12 hours	Self-defined	3	
	< 6 hours	Self-defined	4	

Note: Levels of waring time and criteria that define them may be adjusted based

Table 4.4-1: Summary of Risk Factor Approach

Risk Assessment Category	Degree of Risk				Weight Value
	Level	Criteria		Index	
Have warning measures been implemented?			on hazard addressed.		
DURATION How long does the hazard event usually last?	< 6 hours	Self-defined	Note: Levels of duration time and criteria that define them may be adjusted based on hazard addressed.	1	10%
	< 24 hours	Self-defined		2	
	< 1 week	Self-defined		3	
	> 1 week	Self-defined		4	
CLIMATE CHANGE How will climate change impact the other 5 ratings for the hazard?	Negative Impact	Expected to increase risks.		⬆	N/A
	Potential Negative	Potential to increase risks.		⟷	
	Little To No Impact	No impact or small risk increase through indirect means.		⟷	
	Positive Impact	Risk expected to decrease.		⬇	

4.4.2 Ranking Results

Using the methodology described in Section 4.4.1, Table 4.4-2 lists the Countywide RF calculated for each of the 27 potential hazards identified in the 2025 HMP Update. Hazards identified as *high* risk have risk factors greater than 2.5. Risk Factors ranging from 2.0 to 2.4 were deemed *moderate* risk hazards. Hazards with Risk Factors 1.9 and less are considered *low* risk. Based on these results, Centre County has seven high risk hazards, 11 moderate risk hazards, and nine low risk hazards for a total of 27 hazards.

Table 4.4-2: Ranking of Hazard Types Based on Risk Factor Methodology

RISK	HAZARD NATURAL (N) OR MAN-MADE (M)	RISK ASSESSMENT CATEGORY						RF
		PROBABILITY	IMPACT	SPATIAL EXTENT	WARNING TIME	DURATION	CLIMATE CHANGE	
HIGH	Flood, Flash Flood, Ice Jam (N)	3	3	3	3	3	⬆	3.0
	Pandemic and Infectious Disease (N)	2	4	3	1	4	⟷	2.9

Table 4.4-2: Ranking of Hazard Types Based on Risk Factor Methodology

RISK	HAZARD NATURAL (N) OR MAN-MADE (M)	RISK ASSESSMENT CATEGORY						RF
		PROBABILITY	IMPACT	SPATIAL EXTENT	WARNING TIME	DURATION	CLIMATE CHANGE	
	Transportation Incidents (M)	4	3	1	4	1	↑	2.8
	Winter Storm (N)	3	2	4	1	3	↔	2.7
	Substance Use Disorder (M)	4	3	1	2	1	↔	2.6
	Environmental Hazards (EH) - Hazardous Materials Release (M)	2	3	2	4	3	↔	2.6
	Drought (N)	2	2	4	1	4	↑	2.5
MODERATE	Utility Interruption (M)	3	2	2	3	2	↑	2.4
	EH - Conventional Oil and Gas Wells (M)	2	3	1	4	3	↔	2.4
	EH - Unconventional Oil and Gas (M)	2	3	1	4	3	↔	2.4
	Tornado, Windstorm (N)	2	3	2	4	1	↔	2.4
	Extreme Temperature (N)	2	3	2	1	3	↑	2.3
	Hurricane, Tropical Storm, Nor'easter (N)	2	2	3	1	3	↑	2.2
	Terrorism (M)	1	3	2	4	2	↔	2.2
	Subsidence, Sinkhole (N)	3	2	1	2	2	↔	2.1
	EH - Coal Mining (M)	2	2	1	4	3	↔	2.1
	EH - Gas and Liquid Pipelines (M)	2	2	1	4	3	↔	2.1
	Cyber Terrorism (M)	2	2	1	4	2	↔	2.0
LOW	Dam Failure (M)	1	2	2	4	2	↑	1.9
	Wildfire (N)	2	1	1	4	2	↑	1.7
	Nuclear Incidents (M)	1	1	1	4	4	↔	1.6
	Civil Disturbance (M)	2	1	1	4	1	↔	1.6
	Landslide (N)	2	1	1	4	1	↑	1.6
	Earthquake (N)	1	1	2	4	1	↔	1.5

Table 4.4-2: Ranking of Hazard Types Based on Risk Factor Methodology

RISK	HAZARD NATURAL (N) OR MAN-MADE (M)	RISK ASSESSMENT CATEGORY						RF
		PROBABILITY	IMPACT	SPATIAL EXTENT	WARNING TIME	DURATION	CLIMATE CHANGE	
	Radon Exposure (N)	2	1	1	2	2	⟷	1.5
	Urban Fire and Explosion (M)	2	1	1	1	2	⟷	1.4
	Lightning Strike (N)	1	1	1	4	1	⟷	1.3

Hazard RFs and rankings have remained generally consistent with those identified in the 2021 Plan Update, with a few notable updates due to conversations with municipalities and other stakeholders. Flooding is now the number one hazard, replacing Winter Storm as feedback indicated winter storm probabilities have decreased. Transportation Incidents increased from an RF of 1.9 to 2.8, driven by discussions on their increased frequency and concerns with potential impacts from transporting chemicals and other hazardous materials. The impact rating was also increased to reflect the potential casualties involved in serious incidents. The Pandemic and Infectious Disease RF increased slightly due to an increase in impact rating which greater reflects the potential death toll and other public health harms that may occur. Other notable increases include Substance Use Disorder, Extreme Temperatures, Cyber Terrorism, and Utility Interruption.

With the addition of Coal Mining and Gas and Liquid Pipelines as Environmental Hazards, there are now five. Hazardous Materials Release is a high-risk hazard, while Conventional Oil and Gas Wells, Unconventional Oil and Gas Wells, Coal Mining, and Gas and Liquid Pipelines are medium-risk hazards.

Finally, the Opioid Addiction hazard has been renamed Substance Use Disorder and Transportation Accidents are now Transportation Incidents. These changes reflect those made in the most recent state HMP update.

A risk assessment result for the entire county does not mean that each municipality is at the same amount of risk to each hazard. Table 4.4-3 shows the different municipalities in Centre County and whether their risk is greater than (>), less than (<), or equal to (=) the risk factor assigned to the County as a whole.

A risk assessment result for the entire county does not mean that each municipality is at the same amount of risk to each hazard. Table 4.4-3 shows the different municipalities in Centre County and whether their risk is greater than (>), less than (<), or equal to (=) the risk factor assigned to the County as a whole.

Table 4.4-3: Jurisdictional Risk Evaluation

MUNICIPALITY	Flood, Flash Flood, Ice Jam (N)	Pandemic and Infectious Disease (N)	Transportation Incidents (M)	Winter Storm (N)	Substance Use Disorder (M)	EH - Hazardous Materials Release (M)	Drought (N)	Utility Interruption (M)	Tornado, Windstorm (N)	Extreme Temperature (N)	Hurricane, Tropical Storm, Nor' easter (N)	Terrorism (M)	Subsidence, Sinkhole (N)	EH - Conventional Oil and Gas Wells (M)	EH - Unconventional Oil and Gas (M)	EH - Coal Mining (M)	EH - Gas and Liquid Pipelines (M)	Cyber Terrorism (M)	Dam Failure (M)	Wildfire (N)	Nuclear Incidents (M)	Civil Disturbance (M)	Landslide (N)	Earthquake (N)	Radon Exposure (N)	Urban Fire and Explosion (M)	Lightning Strike (N)
Bellefonte Borough	=	=	=	=	=	=	=	=	=	=	=	=	=	<	<	<	=	=	<	<	=	=	=	=	=	=	=
Benner Township	=	=	>	=	=	>	=	=	>	=	>	>	>	<	<	<	<	=	>	=	<	>	>	=	=	=	=
Boggs Township	=	<	=	=	=	=	=	=	=	=	=	=	<	=	<	<	>	=	<	>	<	=	=	=	=	=	=
Burnside Township	=	=	>	=	=	=	=	>	=	>	>	=	=	>	>	=	>	=	=	>	<	=	=	=	=	=	>
Centre Hall Borough	<	<	<	=	=	<	<	=	>	=	=	<	>	<	<	<	<	=	<	<	<	=	<	=	=	=	=
College Township	=	=	>	=	=	>	=	=	=	=	=	>	>	<	<	<	<	>	>	=	>	>	=	=	=	>	=
Curtin Township	=	=	<	=	=	>	=	=	>	=	>	>	=	>	=	=	=	=	=	>	<	=	=	=	=	=	=

Table 4.4-3: Jurisdictional Risk Evaluation

MUNICIPALITY	Flood, Flash Flood, Ice Jam (N)	Pandemic and Infectious Disease (N)	Transportation Incidents (M)	Winter Storm (N)	Substance Use Disorder (M)	EH - Hazardous Materials Release (M)	Drought (N)	Utility Interruption (M)	Tornado, Windstorm (N)	Extreme Temperature (N)	Hurricane, Tropical Storm, Nor' easter (N)	Terrorism (M)	Subsidence, Sinkhole (N)	EH - Conventional Oil and Gas Wells (M)	EH - Unconventional Oil and Gas (M)	EH - Coal Mining (M)	EH - Gas and Liquid Pipelines (M)	Cyber Terrorism (M)	Dam Failure (M)	Wildfire (N)	Nuclear Incidents (M)	Civil Disturbance (M)	Landslide (N)	Earthquake (N)	Radon Exposure (N)	Urban Fire and Explosion (M)	Lightning Strike (N)
Ferguson Township	=	=	=	=	=	>	>	>	=	=	=	=	>	<	<	<	<	>	=	=	<	=	=	=	=	=	=
Gregg Township	=	=	<	=	=	=	=	=	=	=	=	=	>	<	<	<	<	<	=	=	<	<	<	=	>	=	=
Haines Township	<	=	<	=	<	=	>	=	=	=	=	<	=	<	<	<	<	=	>	=	<	<	=	=	=	<	=
Halfmoon Township	=	=	<	=	<	<	=	=	=	=	=	<	>	<	<	<	<	>	<	=	<	=	=	=	>	=	=
Harris Township	<	>	>	=	=	=	=	>	>	=	>	=	=	<	<	<	=	=	=	>	<	=	<	<	=	=	=
Howard Borough	=	=	<	=	=	<	=	=	=	=	=	<	=	<	<	<	<	=	<	<	<	<	<	=	=	<	=
Howard Township	=	=	<	=	<	<	=	=	>	=	>	<	=	<	<	<	<	<	<	=	<	<	<	=	=	<	=

Table 4.4-3: Jurisdictional Risk Evaluation

MUNICIPALITY	Flood, Flash Flood, Ice Jam (N)	Pandemic and Infectious Disease (N)	Transportation Incidents (M)	Winter Storm (N)	Substance Use Disorder (M)	EH - Hazardous Materials Release (M)	Drought (N)	Utility Interruption (M)	Tornado, Windstorm (N)	Extreme Temperature (N)	Hurricane, Tropical Storm, Nor' easter (N)	Terrorism (M)	Subsidence, Sinkhole (N)	EH - Conventional Oil and Gas Wells (M)	EH - Unconventional Oil and Gas (M)	EH - Coal Mining (M)	EH - Gas and Liquid Pipelines (M)	Cyber Terrorism (M)	Dam Failure (M)	Wildfire (N)	Nuclear Incidents (M)	Civil Disturbance (M)	Landslide (N)	Earthquake (N)	Radon Exposure (N)	Urban Fire and Explosion (M)	Lightning Strike (N)
Huston Township	=	=	=	=	<	<	=	=	>	=	>	<	=	=	<	<	<	<	<	=	<	<	>	=	>	<	=
Liberty Township	>	=	>	=	=	>	=	=	>	=	>	=	=	>	<	<	<	=	>	=	<	=	>	=	>	=	=
Marion Township	=	=	=	=	=	=	=	=	=	=	=	=	=	=	<	<	<	=	<	=	<	=	=	=	=	=	=
Miles Township	=	=	<	=	=	=	=	=	=	=	=	=	>	<	<	<	<	=	=	=	<	=	=	=	>	=	=
Milesburg Borough	>	=	>	=	=	=	=	=	>	=	>	=	=	<	<	<	<	=	<	<	<	=	=	=	=	=	>
Millheim Borough	=	=	<	=	=	=	=	=	=	=	=	=	=	<	<	<	<	=	>	=	<	=	=	=	=	=	=
Patton Township	<	>	>	=	>	=	=	>	=	=	=	=	>	<	<	<	<	>	=	=	<	>	=	=	=	>	>

Table 4.4-3: Jurisdictional Risk Evaluation

MUNICIPALITY	Flood, Flash Flood, Ice Jam (N)	Pandemic and Infectious Disease (N)	Transportation Incidents (M)	Winter Storm (N)	Substance Use Disorder (M)	EH - Hazardous Materials Release (M)	Drought (N)	Utility Interruption (M)	Tornado, Windstorm (N)	Extreme Temperature (N)	Hurricane, Tropical Storm, Nor' easter (N)	Terrorism (M)	Subsidence, Sinkhole (N)	EH - Conventional Oil and Gas Wells (M)	EH - Unconventional Oil and Gas (M)	EH - Coal Mining (M)	EH - Gas and Liquid Pipelines (M)	Cyber Terrorism (M)	Dam Failure (M)	Wildfire (N)	Nuclear Incidents (M)	Civil Disturbance (M)	Landslide (N)	Earthquake (N)	Radon Exposure (N)	Urban Fire and Explosion (M)	Lightning Strike (N)
Penn Township	>	<	<	>	<	>	=	=	>	=	>	=	=	<	<	<	<	=	>	=	<	=	=	=	>	=	=
Philipsburg Borough	<	=	>	<	=	>	=	=	=	=	>	=	<	>	>	<	<	=	>	=	<	>	<	<	=	>	=
Port Matilda Borough	>	=	>	=	=	=	=	=	=	=	=	=	=	<	<	<	<	=	<	<	<	=	<	=	>	=	=
Potter Township	=	=	=	=	=	=	=	=	>	=	>	=	>	<	<	<	>	=	>	=	<	=	=	=	>	=	>
Rush Township	=	=	>	=	=	>	=	=	=	=	=	=	=	=	=	>	<	=	>	>	<	=	>	=	=	=	=
Snow Shoe Borough	<	=	=	=	=	=	=	=	=	=	=	=	<	=	=	>	<	=	<	<	<	=	=	=	=	=	=
Snow Shoe Township	=	=	<	=	=	=	=	=	=	=	=	=	=	>	>	>	=	=	=	>	<	=	=	=	=	=	=

Table 4.4-3: Jurisdictional Risk Evaluation

MUNICIPALITY	Flood, Flash Flood, Ice Jam (N)	Pandemic and Infectious Disease (N)	Transportation Incidents (M)	Winter Storm (N)	Substance Use Disorder (M)	EH - Hazardous Materials Release (M)	Drought (N)	Utility Interruption (M)	Tornado, Windstorm (N)	Extreme Temperature (N)	Hurricane, Tropical Storm, Nor' easter (N)	Terrorism (M)	Subsidence, Sinkhole (N)	EH - Conventional Oil and Gas Wells (M)	EH - Unconventional Oil and Gas (M)	EH - Coal Mining (M)	EH - Gas and Liquid Pipelines (M)	Cyber Terrorism (M)	Dam Failure (M)	Wildfire (N)	Nuclear Incidents (M)	Civil Disturbance (M)	Landslide (N)	Earthquake (N)	Radon Exposure (N)	Urban Fire and Explosion (M)	Lightning Strike (N)
Spring Township	=	=	>	=	>	>	=	=	=	>	=	=	>	<	<	<	>	=	<	=	<	<	<	=	=	=	=
State College Borough	<	>	>	=	=	>	=	>	=	=	=	>	>	<	<	<	<	>	<	=	>	>	=	=	>	>	=
Taylor Township	>	=	=	=	=	=	=	=	>	=	>	=	=	=	<	<	<	=	<	>	<	=	>	=	=	=	=
Union Township	=	=	=	=	=	=	=	=	>	=	>	<	=	=	<	<	<	<	=	>	<	<	=	=	=	<	=
Unionville Borough	>	=	>	=	=	=	=	=	=	=	=	=	=	<	<	<	<	=	>	<	<	=	=	=	=	=	=
Walker Township	>	=	<	=	=	=	=	=	=	=	=	=	>	=	<	<	<	=	<	>	<	=	=	=	=	=	=
Worth Township	>	>	>	=	>	=	=	=	=	=	=	=	=	>	<	<	<	=	<	>	<	=	>	=	=	=	>

This table was developed based on the Risk Assessment findings and municipal input from the "Evaluation of Identified Hazards and Risk" and "Jurisdictional Hazard Risk Ranking" forms distributed to each municipality. Most municipalities also met with the HMSC to discuss the forms. Those changes are reflected in the table.

Potential Loss Estimates

Potential loss estimates for hazard events help a community understand the monetary value of what might be at stake during a hazard event. Estimates are considered *potential* in that they generally represent losses that could occur in a countywide hazard scenario. In events that are localized, losses may be lower, while regional events could yield higher losses.

Potential loss estimates have four basic components, including:

- Replacement Value: Current cost of returning an asset to its pre-damaged condition, using present-day cost of labor and materials.
- Content Loss: Value of building's contents, typically measured as a percentage of the building replacement value.
- Functional Loss: The value of a building's use or function that would be lost if it were damaged or closed.
- Displacement Cost: The dollar amount required for relocation of the function (business or service) to another structure following a hazard event.

Loss estimates provided in this section fall into three broad categories: historical losses, current-condition losses, and predictive losses. Historical loss estimates come from three primary sources: the NCEI storm events database, the NFIP, and the USDA's Risk Management Agency (RMA) annual crop indemnities dating from 1980-2023. Current condition losses come from geospatial analysis of the value of buildings identified as vulnerable in the vulnerability assessment sections of hazard profiles for floods, landslides, subsidence, wildfires, dam failure, environmental hazards, and transportation incidents. Finally, predictive losses were generated using Hazus-MH, version 6.1. Historical losses do not consider any of the aforementioned components, but they do provide insight into what future losses might be. The current-condition losses consider replacement value and exposure value. Hazus modeling considers all four components and provides the most comprehensive description of potential losses.

4.4.2.1 Historic Losses

Historical losses were determined for drought, flooding, coastal storms (hurricanes/tropical storms/nor'easters), tornadoes/windstorms, lightning strike, and winter storms from NCEI, USDA RMA, and the NFIP. NCEI reports include property and crop damage estimates. However, as noted in the hazard profiles, many of the events

have no damages reported. This does not mean that there were no damages; rather, it indicates that no damages were reported to NCEI. As a result, these should be considered low-end estimates of losses. The flood and flash flood events reported in NCEI list more than $6.7 million in property damage since 2010. There have been over 20 events reported to NCEI due to winter storms since 2010, although in most events, damages were not provided. Since 2010, windstorm and tornado events resulted in more than $205,000 in property damages and one injury reported to NCEI. There were two lightning events and $510,000 in property damages listed in NCEI since 2010. There were no damages, deaths, or casualties reported for extreme temperatures, coastal storm events, or wildfires in the NCEI database (NCEI, 2024).

Agriculture is a vital part of Centre County's economy, and agricultural production is highly vulnerable to natural hazards. Losses are available from the RMA, which operates and manages the Federal Crop Insurance Corporation providing crop insurance to American farmers. While not all crops are insured through RMA, their records provide strong insight into agricultural losses. Table 4.4-4 illustrates the total amount of indemnities paid through RMA since 1989 in Centre County by type of crop failure. The data was obtained in October 2024. Only crop failures related to the hazards discussed in this plan are listed. There has been $8.7 million in indemnity paid out due to crop loss between 1989 and 2024 in Centre County. The greatest amount of indemnity paid out was due to crop loss from drought, which accounts for 68.8 percent of the loss. There has been $2.25 million in indemnity paid due to drought since 2019, which account for nearly all the losses in that time frame.

Table 4.4-4: Historic Insured Crop Losses, 1989-2024 (USDA RMA, 2024)

REASON FOR LOSS	INDEMNITY AMOUNT
Cold Wet Weather	$205,364.60
Drought	$6,016,366.45
Excess Moisture/Precipitation/Rain	$1,199,304.60
Flood	$4,322.00
Cold Winter or Freeze or Frost	$43,690.00
Heat	$33,328.20
Hurricane/Tropical Depression	$1,066.00
Tornado	$1,486.00
Wind/Excess Wind	$31,417.00
Other	$1,204,882.20
Total	**$8,741,227.05**

The final set of historic losses relates solely to prior flood losses and comes from the NFIP's records of claims paid. Table 4.4-5 shows the total amount of claims paid in each

municipality according to FEMA's Community Information System (CIS). Since municipalities joined the NFIP, a total of $3.17 million has been paid to municipalities in the County, over $1.5 million of which was paid to 18 claims in Bellefonte Borough and 59 in Milesburg Borough.

Table 4.4-5: Centre County NFIP Polices and Claims Information (FEMA CIS, 2024a) (FEMA CIS, 2024b)

COMMUNITY	POLICIES IN FORCE	TOTAL PREMIUM AND COVERAGE	PRIOR CLAIMS	TOTAL AMOUNT OF PAID CLAIMS	SUBSTANTIAL DAMAGE CLAIMS
Bellefonte Borough	3	$809,000	18	$1,020,684	1
Benner Township	3	$514,000	6	$8,814	0
Boggs Township	24	4,804,000	20	$49,672	0
Burnside Township	0	$0	5	$11,035	0
Centre Hall Borough	0	$0	2	$0	0
College Township	12	3,870,000	32	$378,208	2
Curtin Township	3	$515,000	2	$13,698	0
Ferguson Township	10	$2,661,000	9	$43,786	0
Gregg Township	5	$1,009,000	19	$82,510	0
Haines Township	3	$610,000	11	$4,498	0
Halfmoon Township	4	$895,000	0	$0	0
Harris Township	4	$1,166,000	8	$9,108	0
Howard Borough	0	$0	0	$0	0
Howard Township	1	$250,000	0	$0	0
Huston Township	3	$317,000	2	$0	0
Liberty Township	8	$724,000	11	$41,549	0
Marion Township	0	$0	0	$0	0
Miles Township	0	$0	0	$0	0
Milesburg Borough	17	$2,470,000	59	$528,285	4
Millheim Borough	6	$610,000	11	$95,020	2
Patton Township	9	$2,917,000	5	$18,856	0
Penn Township	3	$294,000	46	$244,684	3
Philipsburg Borough	10	$1,528,000	21	$31,889	0
Port Matilda Borough	3	$648,000	2	$4,339	0
Potter Township	3	$780,000	8	$25,626	0
Rush Township	15	$2,403,000	27	$196,325	1
Snow Shoe Borough	0	$0	2	$2,427	0

Table 4.4-5: Centre County NFIP Polices and Claims Information (FEMA CIS, 2024a) (FEMA CIS, 2024b)

COMMUNITY	POLICIES IN FORCE	TOTAL PREMIUM AND COVERAGE	PRIOR CLAIMS	TOTAL AMOUNT OF PAID CLAIMS	SUBSTANTIAL DAMAGE CLAIMS
Snow Shoe Township	4	$738,000	0	$0	0
Spring Township	20	$5,857,000	18	$96,268	0
State College Borough	11	$3,256,000	5	$221,141	1
Taylor Township	4	$1,078,000	0	$0	0
Union Township	2	$700,000	3	$25,780	0
Unionville Borough	1	$15,000	5	$7,091	0
Walker Township	4	$776,000	7	$9,877	0
Worth Township	3	$1,500,000	0	$0	0
Total	**198**	**$43,714,000**	**364**	**$3,171,170**	**14**

4.4.2.2 Current Condition Losses

The current condition losses were derived using the total assessed value, including land and building values, from the Centre County Tax Assessment Database. Table 4.4-6 details the total assessed values by municipality and type of land. Please note, the data received from Centre County attributed values for buildings and land by parcels. If there was more than one structure on one parcel, then the values would be increased by the number of structures on the parcel; this may inflate the total assessed value, though this was not a common occurrence.

Table 4.4-6: Centre County Tax Assessed Building Values (Centre County, 2024)

MUNICIPALITY	LAND USES						
	COMMERCIAL	INDUSTRIAL	PUBLIC UTILITIES	RESIDENTIAL	SEASONAL	VACANT LAND	GRAND TOTAL
Bellefonte Borough	$65,156,625	$774,410	$223,650	$78,815,305	-	$837,625	$145,807,615
Benner Township	$152,352,840	$6,753,635	$4,140	$111,692,395	$601,405	$2,992,745	$274,397,160
Boggs Township	$22,679,495	$5,408,880	$52,225	$42,469,630	$1,181,725	$2,550,160	$74,342,115
Burnside Township	$672,690	-	-	$7,655,370	$2,259,280	$7,387,240	$17,974,580
Centre Hall Borough	$4,734,800	-	$27,550	$22,229,495	-	$178,475	$27,170,320
College Township	$342,198,875	$6,092,060	$589,235	$290,308,950	$38,540	$5,968,745	$645,196,405
Curtin Township	$613,810	-	-	$7,704,450	$2,114,970	$3,314,010	$13,747,240
Ferguson Township	$242,138,470	$5,808,625	$41,645	$426,008,090	$449,830	$6,697,720	$681,144,380
Gregg Township	$5,315,655	$109,120	$25,375	$47,350,320	$1,776,380	$2,078,210	$56,655,060
Haines Township	$2,188,905	$225,780	-	$27,810,140	$3,086,675	$4,532,950	$37,844,450
Halfmoon Township	$1,313,525	-	-	$79,821,600	$446,770	$2,047,765	$83,629,660
Harris Township	$26,869,870	$177,760	$153,280	$208,045,435	$770,680	$6,234,045	$242,251,070
Howard Borough	$1,501,435	$43,530	$26,400	$9,509,030	-	$178,505	$11,258,900
Howard Township	$4,429,235	-	-	$15,772,830	$278,805	$569,955	$21,050,825
Huston Township	$1,920,500	$5,280	-	$24,318,750	$469,015	$1,378,880	$28,092,425
Liberty Township	$2,759,455	-	$9,750	$22,641,350	$2,998,665	$2,423,205	$30,832,425
Marion Township	$1,649,545	$371,435	-	$24,466,110	$145,920	$1,195,010	$27,828,020
Miles Township	$3,226,110	$145,350	-	$28,096,025	$2,502,205	$3,310,885	$37,280,575
Milesburg Borough	$2,273,060	-	$41,435	$12,959,500	$14,925	$246,425	$15,535,345
Millheim Borough	$2,355,390	-	$74,885	$13,660,790	-	$486,140	$16,577,205

Table 4.4-6: Centre County Tax Assessed Building Values (Centre County, 2024)

MUNICIPALITY	LAND USES						
	COMMERCIAL	INDUSTRIAL	PUBLIC UTILITIES	RESIDENTIAL	SEASONAL	VACANT LAND	GRAND TOTAL
Patton Township	$236,004,835	$393,290	$15,105	$328,132,955	$148,750	$4,053,120	$568,748,055
Penn Township	$13,765,660	$207,440		$21,523,090	$2,749,900	$2,010,710	$40,256,800
Philipsburg Borough	$15,752,360	-	$257,130	$26,190,575	$34,870	$644,530	$42,879,465
Port Matilda Borough	$3,050,885	-	$55,105	$6,040,555	-	$338,095	$9,484,640
Potter Township	$16,103,160	$1,054,850	$38,805	$95,705,140	$2,457,340	$4,922,505	$120,281,800
Rush Township	$20,360,185	$1,165,885	$378,995	$60,524,150	$2,685,900	$7,329,835	$92,444,950
Snow Shoe Borough	$2,567,615	-	$19,690	$8,842,645	$12,855	$238,830	$11,681,635
Snow Shoe Township	$5,569,745	$610,135	-	$23,768,205	$7,112,520	$6,372,945	$43,433,550
Spring Township	$58,988,275	$10,326,050	$148,845	$158,592,675	$267,015	$3,185,845	$231,508,705
State College Borough	$803,578,895	$103,970	$358,000	$271,307,345	-	$3,733,570	$1,079,081,780
Taylor Township	$1,600,930	$1,212,730	$3,160	$15,880,490	$732,020	$1,307,225	$20,736,555
Union Township	$1,377,185	-	-	$27,093,370	$919,080	$2,466,175	$31,855,810
Unionville Borough	$105,440	-	-	$3,691,125	-	$57,325	$3,853,890
Walker Township	$7,172,835	$67,205	$38,145	$108,437,445	$682,030	$2,468,135	$118,865,795
Worth Township	$1,599,430	-	-	$15,325,400	$609,595	$781,770	$18,316,195
Total	**$2,073,947,725**	**$41,057,420**	**$2,582,550**	**$2,672,390,730**	**$37,547,665**	**$94,519,310**	**$4,922,045,400**

4.4.2.3 Predictive Losses

This 2025 Plan Update employed an enhanced Hazus analysis for floods. As opposed to basic analysis using only default data, enhanced analysis incorporates both up-to-date and specific data for inclusion in the hazard models. The enhanced data incorporated into this HMP include:

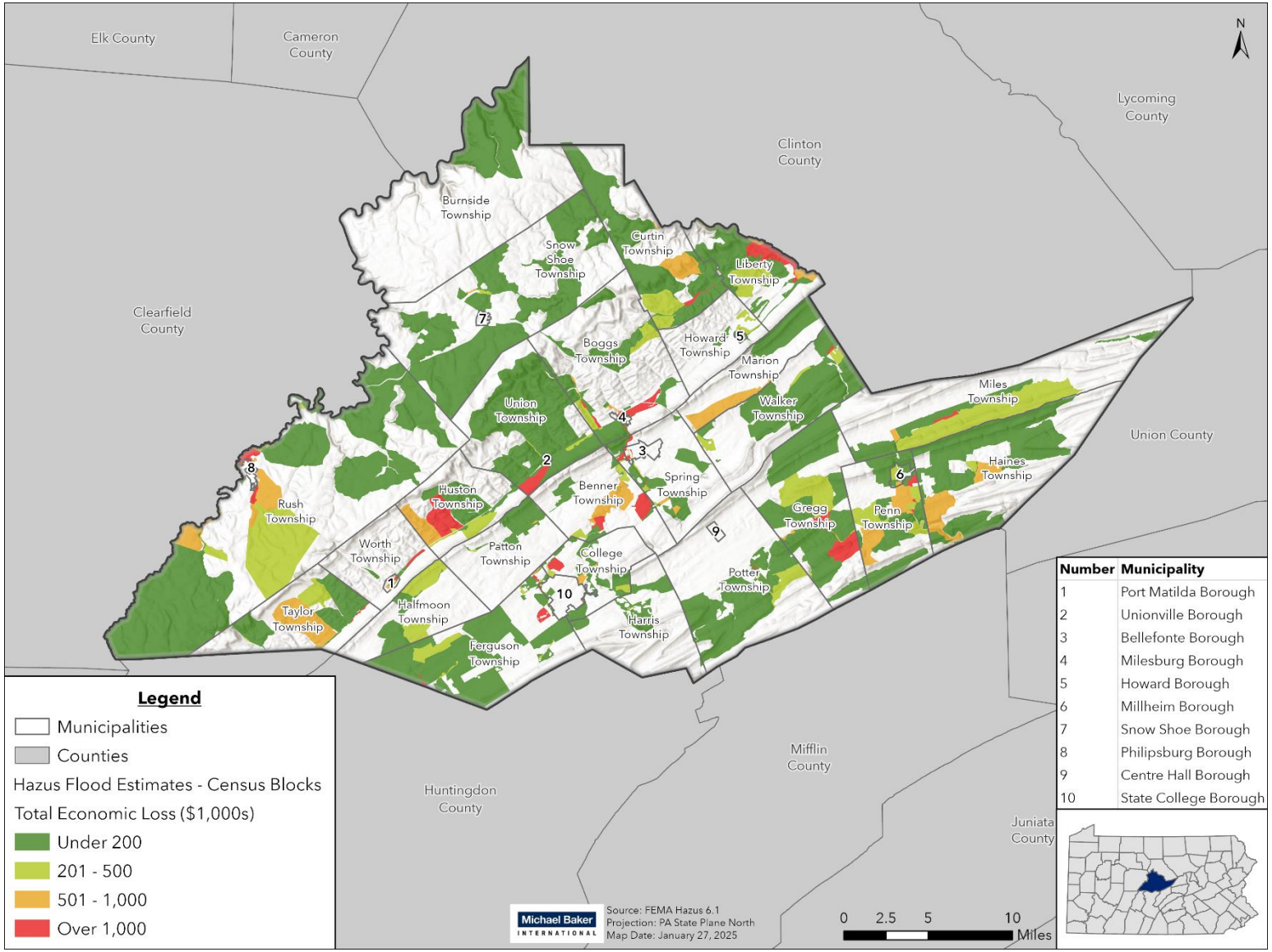
- Demographic data from the 2020 Census
- Updated critical facilities data from the County
- Dasymetric Census blocks to better attribute areas of population geographically within the block
- A user-delineated 100-year depth grid derived for Centre County from the effective FIRM data.

For more details on the HAZUS methodology used and additional results reports, see Appendix F – HAZUS Methodology and Results Report.

Using these datasets in Hazus-MH Version 6.1, total economic losses from a 1-percent-annual-chance flood in Centre County are estimated at $5.8 billion, nearly all of which is attributed to building loss. Residential occupancies make up 68.8 percent of the total estimated building-related losses, and commercial buildings make up a further 18.1 percent of the losses. According to the model, no critical facilities would suffer damage.

Figure 4.4-1 shows the distribution of building-related losses by census block across Centre County. The areas with the highest potential losses are concentrated in the southern and central parts of Centre County, particularly along Spring Creek in College and Spring Townships as well near Foster Joseph Sayers Lake in Howard Borough, Howard Township, and Liberty Township. The full HAZUS results report can be found in Appendix F.

Figure 4.4-1: Centre County Potential Loss Calculated with Hazus



4.4.3 Future Development and Vulnerability

Risk and vulnerability to natural and human-made hazard events are not static. Risk will increase or decrease as counties and municipalities see changes in land use and development as well as changes in population.

Population change is perhaps the most significant indicator of future changes in vulnerability. As discussed in Section 2.3, the total population in Centre County is estimated to have increased by approximately 2.7 percent, between the 2010 and 2020. However, this increase is not equally distributed across the County. Population increased in some municipalities but declined in others.

Countywide population is expected to continue increasing in the future. Population projections issued by the Center for Rural Pennsylvania in October 2023 show a continued trend in population gain for the County as a whole, as shown in Table 4.4-7. These are the most current population projections. They show smaller growth than the 2015 PA DEP report that was used in the previous plan, potentially due to the use of 2020 Census data that showed there was far less population growth than the 2015 estimates projected. For example, PA DEP projected that the County population would increase 8.4 percent between 2010 and 2020, but the Census estimated that it only grew 2.7 percent. PA DEP also projected an increase of 28 percent between 2010 and 2040, while the Center for Rural Pennsylvania projections estimate an 11.4 percent increase.

While these latest projections show smaller growth, they do still project that Centre County will be the sixth fastest growing county in the state between 2020 and 2050 with a 12.2% population increase. The report also states that urban areas will experience the most growth across the state while rural areas are projected to decline in population. This will likely result in increased development pressure on urbanized areas such as those near State College Borough and the surrounding Centre Region. It is important to note that these population figures are projections only and are derived from birth rates, death rates, and migration information and may not fully capture population dynamics.

Table 4.4-7: Centre County population data and projections (U.S. Census, 2022; Center for Rural Pennsylvania, 2023)

Data	Population	Percent Change
2000 Census	135,320	13.8%
2010 Census	153,990	
Percent Change 2000 – 2010		
2020 Census	158,172	2.7%
Percent Change 2010 – 2020		

Table 4.4-7: Centre County population data and projections (U.S. Census, 2022; Center for Rural Pennsylvania, 2023)

Data	Population	Percent Change
2030 Projection	165,510	4.6%
Percent Change 2020 – 2030		
2040 Projection	171,485	3.6%
Percent Change 2030 – 2040		
2050 Projection	177,459	3.5%
Percent Change 2040 – 2050		
Percent Change 2020 – 2050		12.2%

The two major development nodes of Centre County include the Centre Region and Bellefonte Borough. The predominant population center is the Centre Region, which is a center of commercial and business enterprises and is the most rapidly developing area of the County. With the presence of the Pennsylvania State University, areas immediately surrounding the University Park Campus have housing and population density characteristics that resemble some of the larger metropolitan areas in the Commonwealth, even though much of the rest of Centre County is quite rural. For example, this area possesses a high concentration of multi-unit (10 or more) structures, indicating a high-density population, needed to house the student population and workers at the university and related service industries.

The second most populous and growing area is the Nittany Valley Region, which includes the County seat, Bellefonte Borough. This region's mix of residential, commercial, and agricultural lands is shifting as housing and commercial development continues. The Penns Valley Region remains mostly rural with predominantly agricultural characteristics. However, as the County's population continues to grow, this area is beginning to feel the pressure of increasing subdivision and development. The Lower Bald Eagle, Moshannon Valley, Mountaintop, and Upper Bald Eagle Regions are noted for their mountains, agricultural valleys, and forest lands. Though dotted with small, rural communities, much of these regions are sparsely populated. Figure 4.4-2 illustrates contrast between the undeveloped and developed areas of the County. Figure 4.4-3 shows the overall growth for the planning regions, as calculated by Centre County in 2014.

Figure 4.4-2: Centre County Overall Growth by Planning Region (CCPCDO, 2015)

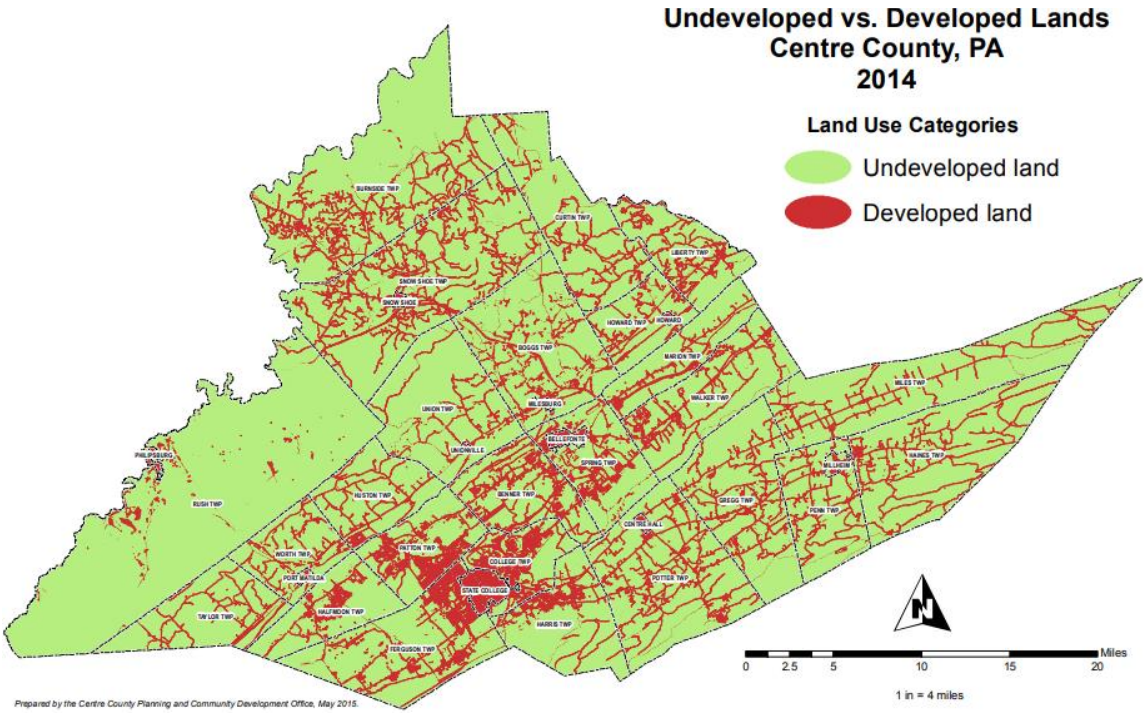
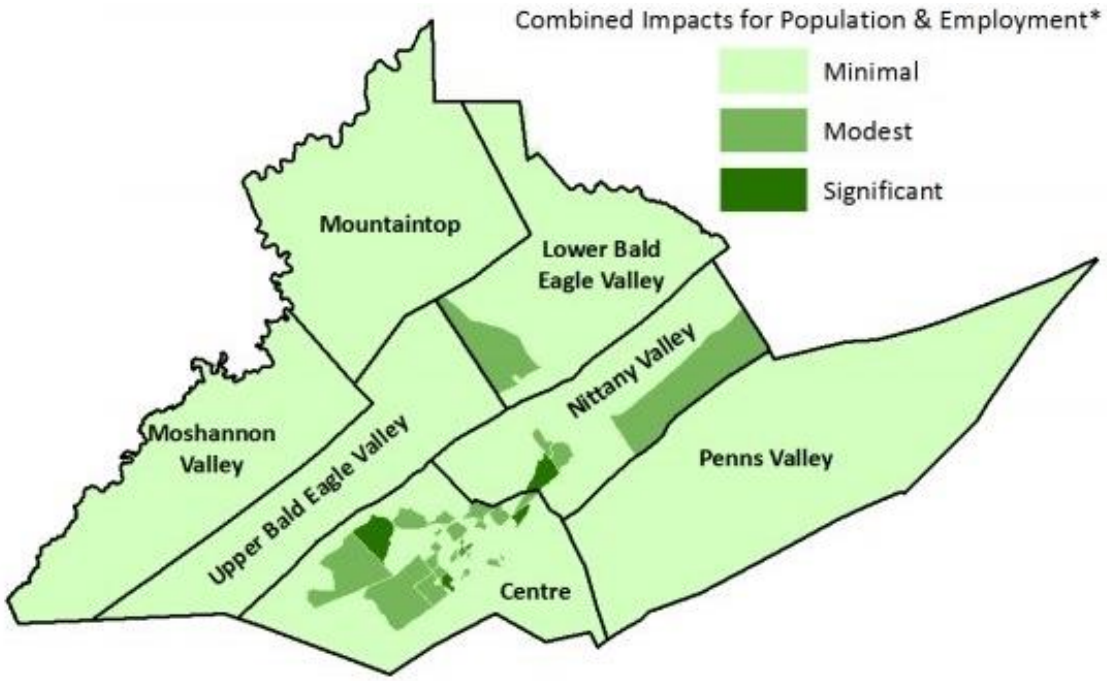


Figure 4.4-3: Centre County Impacts for Population and Employment (CCPCDO, 2015)

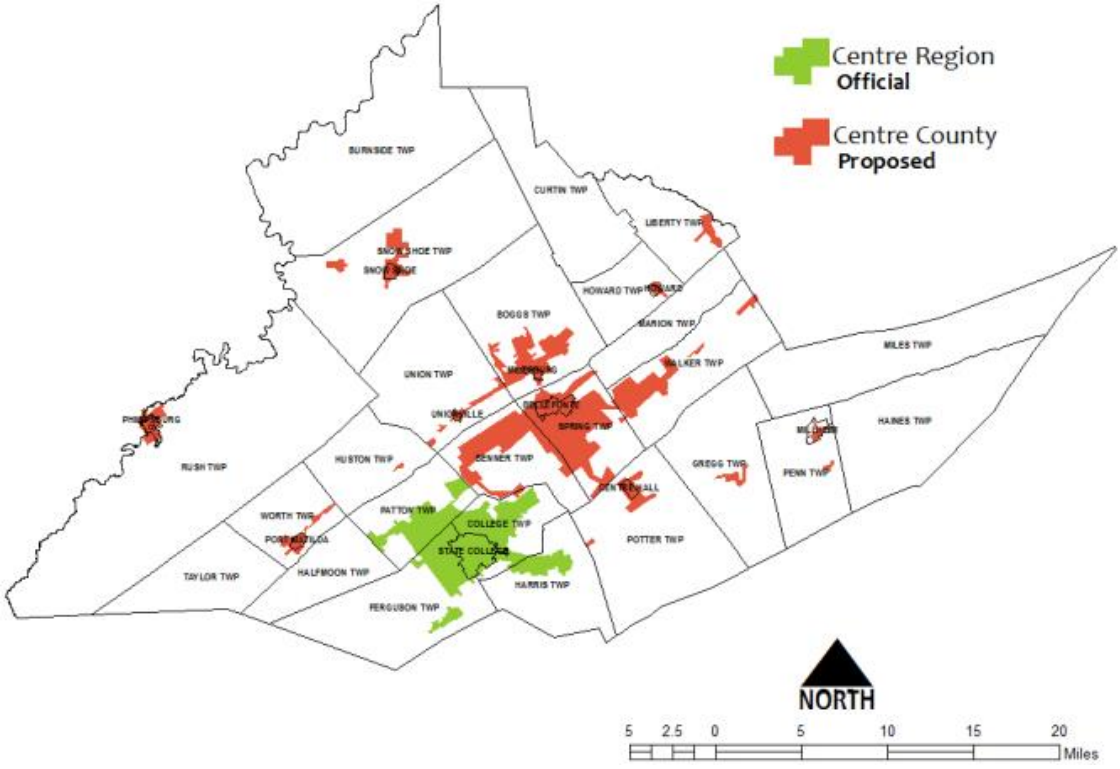


*Summarized totals of population and employment in 2040 at the Transportation Analysis Zone (TAZ) level.

With few exceptions, most land and structures within hazard areas are either homes or agricultural in nature; however, there are some seasonal homes in fire-prone or landslide-prone areas. For the other identified natural hazards, there can be no significant differentiation in locations likely to be impacted, so all future development must be required to take these risks into account. For a full discussion of development trends and land uses, see the 2003 Centre County Comprehensive Plan - Phase 1 and the 2015 Land Use section of the Centre County Comprehensive Plan – Phase II Implementation and Strategies.

As part of the County's comprehensive plan update, additional growth boundaries were proposed, which would promote density development in areas where core infrastructure in the County is located. Figure 4.4-4 illustrates the current and proposed regional growth boundaries as depicted in the Economic Development section of the plan update entitled Comprehensive Plan Phase II – Implementation Strategies (CCPCDO, 2016). The plan also sets the goal of identifying available land and buildings for development, which could prevent the conversion of green space and promote redevelopment in areas with existing infrastructure.

Figure 4.4-4: Centre County Regional Growth Boundaries – Official and Proposed (CCPCDO, 2015)



Although a countywide future land use map is not currently available, a plan does exist for the Centre Region planning area. As mentioned previously, the Centre Region is the employment and population hub for the County. Figure 4.4-5 displays the Future Land Use Plan for the Centre Region, as illustrated in 2013 Centre Region Comprehensive Plan. As seen in the map, projected land use for the area is primarily located within the regional growth boundary with residential and commercial uses surrounding the State College Borough and Penn State University's campus. Figure 4.4-6 displays the Future Land Use plan for the Nittany Valley Region, as described in the 2019 Comprehensive Plan Update. The region is primarily comprised of conserved natural and agricultural lands with identified growth areas for residential and commercial uses. Figure 4.4-7 displays the draft Future Land Use plan for the Penns Valley Region, as described in the draft 2025 Comprehensive Plan Update. The majority of this region is conserved forest and agricultural lands with designated areas for high density residential growth.

In addition to population growth, historical development data through recoded subdivision and land development activity provides insight into where growth is occurring in the County. The CCPCDO publishes annual reports on subdivision and land development activity in the County. Table 4.4-7 displays the total number of recorded new files and plans for subdivision and land development in Centre County by regional planning area from 2019 to 2022. As seen from Table 4.4-7, the greatest share of growth in the County has occurred in the Centre Region, which accounted for 58.3 percent of the acres developed and 81.4 percent of the units created. Annually, the region accounts for more than one-third of the County's growth. The Nittany Valley and Penns Valley Regions account for the next largest share of overall growth in the County. In total, 255.91 acres were developed, and 1,376 housing units were created in the County.

Figure 4.4-5: Future Land Use in the Centre Region (CRPA, 2013)



Figure 4.4-6: Future Land Use in the Nittany Valley Region (Nittany Valley Region Planning District, 2019)

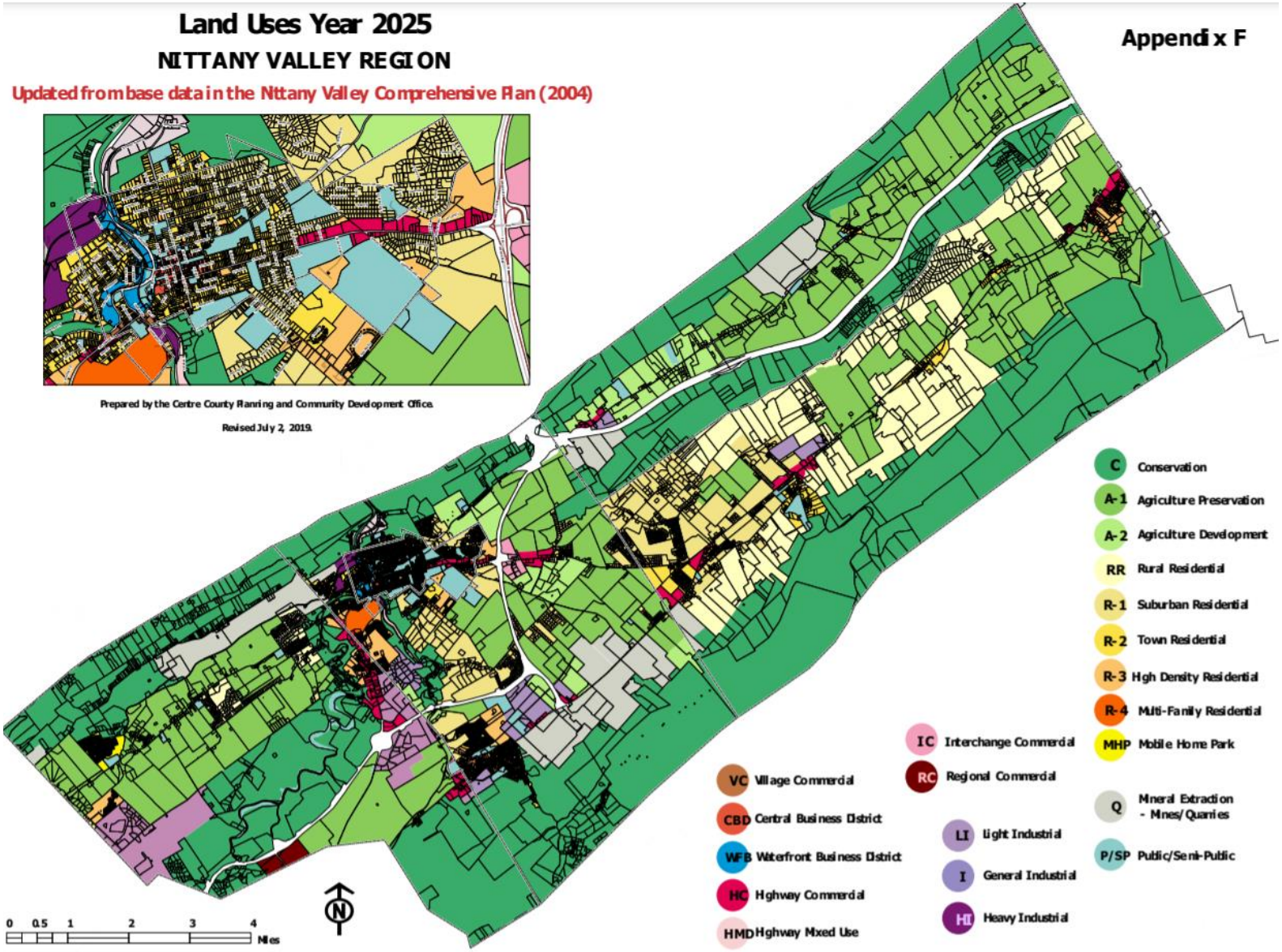


Figure 4.4-7: Future Land Use in the Nittany Valley Region (Penns Valley Region Planning District, 2020)

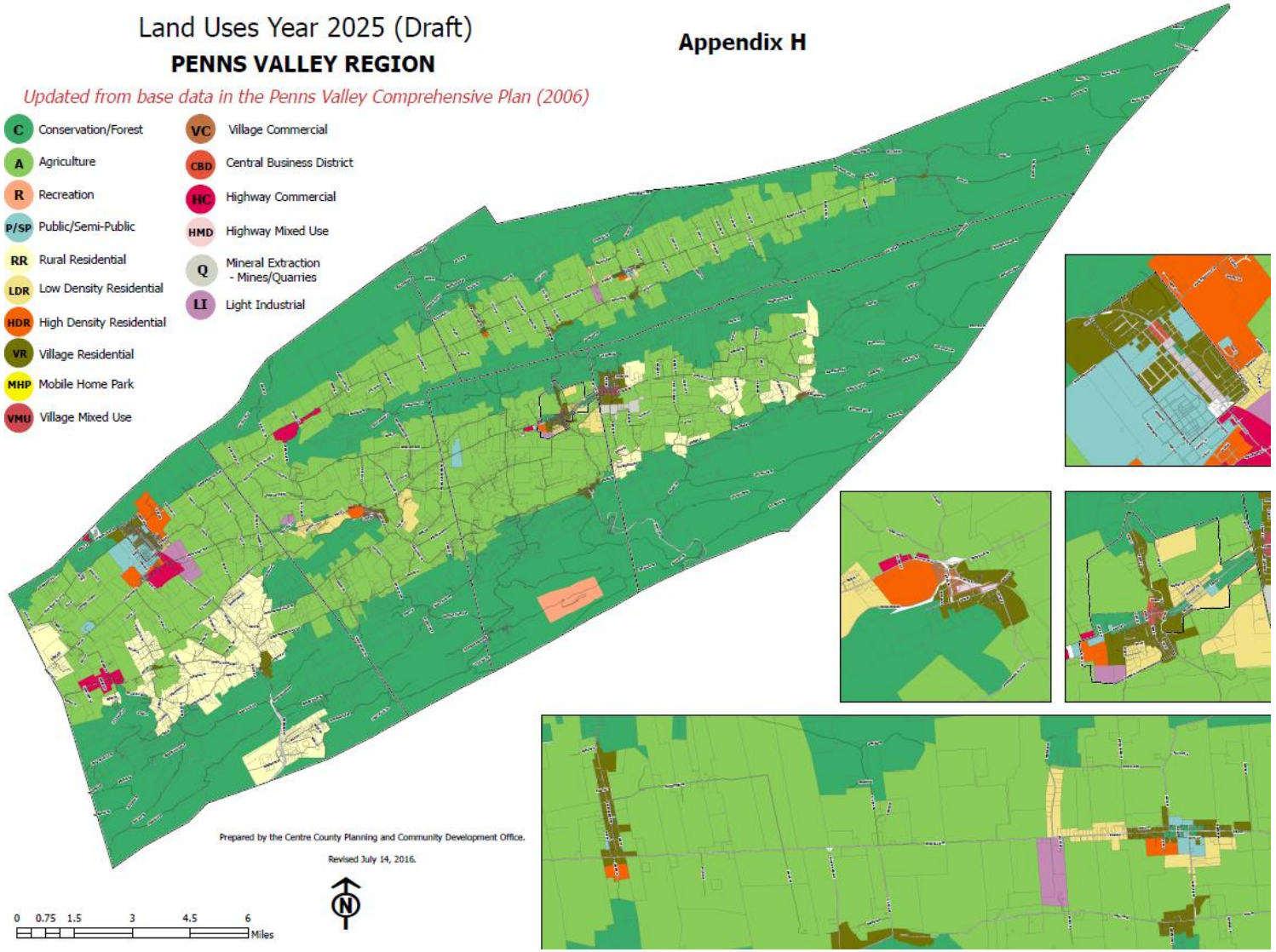


Table 4.4-8: Centre County Subdivision and Land Development Data (CCPCDO, 2022)

PLANNING REGION	2019			2020			2021			2022		
	NEW FILES CREATED	TOTAL RECORDED PLANS	ACRES DEVELOPED	NEW FILES CREATED	TOTAL RECORDED PLANS	ACRES DEVELOPED	NEW FILES CREATED	TOTAL RECORDED PLANS	ACRES DEVELOPED	NEW FILES CREATED	TOTAL RECORDED PLANS	ACRES DEVELOPED
Centre Region	90	89	50.93	50	49	32.87	58	76	37.42	62	72	28.08
Lower Bald Eagle Valley Region	16	17	0.00	15	15	0.00	8	7	0.00	11	6	0.00
Nittany Valley Region	39	39	15.85	30	31	47.04	40	25	2.27	36	30	14.60
Moshannon Valley Region	5	3	0.00	6	7	3.01	8	2	0.00	9	11	0.02
Mountaintop Region	6	7	0.00	7	4	0.00	7	8	0.00	3	1	0.00
Penns Valley Region	39	32	5.81	36	17	0.00	35	34	5.06	31	23	8.95
Upper Bald Eagle Region	16	12	0.00	12	16	4.00	11	8	0.00	8	6	0.00
Total	**211**	**199**	**72.59**	**156**	**139**	**86.92**	**167**	**160**	**44.75**	**160**	**149**	**51.65**

Development regulations have influenced a decrease in hazard risk in Centre County since 2020. As Table 4.4-8 shows there has been continued development in the County across all planning regions. Hazard risk has been considered in relation to this development per the regulations provided in the County's Subdivision and Land Development Ordinance, which outlines guidance in at risk areas. The regulations have remained the same since 2020.

Article XI of the County's Subdivision and Land Development Ordinance outlines additional requirements for floodplain areas. These requirements are meant to regulate development of flood prone areas, encourage the implementation of designs that reduce flood damage, protect individuals from buying lands unsuitable for use due to flood hazards, and to discourage the placement of new structures within the flood zone. General requirements include:

- Land in flood prone areas may be developed if all buildings and structures on the land are not developed on the flood prone areas of land.
- No development will be approved if proposed development will increase the regulatory flood elevation.
- The Commission can limit where development occurs on flood prone land.

While the County Subdivision and Land Development Ordinance only addresses regulations related to flood, the County is also committed to regulating development in other hazard prone areas. The County plans to leverage this hazard mitigation plan to identify areas at risk and to continue discussions on how to integrate these findings into future plans for development.

Making use of the analysis of Centre County's current and future population and development trends, it is important to explore how these projected changes may influence the County's future vulnerability to the profiled hazards. Hazard vulnerability and loss potential will be higher in the places of higher density, so as areas continue to grow and densify, these communities might become more vulnerable to the hazards identified and analyzed in the profiles above. Population growth and its associated development is likely to create increases in loss potential, as more people may be living in areas prone to hazards. Table 4.4-8 below showcases the expected impact of population change and land use and development on the impacts of each hazard for each planning region. The analysis was done at the planning region level due to the best available development data being at this level and the municipalities often interact with the county as planning regions for things such as land use planning and development. As stated earlier, population projections were not available at either the planning region or municipality level, so the population changes recorded between 2010 and 2022, as shown in Section 2.3, were considered.

This updated plan can be used to inform ongoing land use and other planning efforts by the County. The analysis and associated maps within this Plan Update can assist Centre County in accomplishing their goals of development and redevelopment and actions to make areas less prone to the negative impacts of hazards.

Table 4.4-9: Effects of Potential Population, Land Use, and Development Changes on Hazard Impacts by Planning Region

PLANNING REGION	Flood, Flash Flood, Ice Jam (N)	Pandemic and Infectious Disease (N)	Transportation Incidents (M)	Winter Storm (N)	Substance Use Disorder (M)	EH - Hazardous Materials Release (M)	Drought (N)	Utility Interruption (M)	Tornado, Windstorm (N)	Extreme Temperature (N)	Hurricane, Tropical Storm, Nor' easter (N)	Terrorism (M)	Subsidence, Sinkhole (N)	EH - Conventional Oil and Gas Wells (M)	EH - Unconventional Oil and Gas (M)	EH - Coal Mining (M)	EH - Gas and Liquid Pipelines (M)	Cyber Terrorism (M)	Dam Failure (M)	Wildfire (N)	Nuclear Incidents (M)	Civil Disturbance (M)	Landslide (N)	Earthquake (N)	Radon Exposure (N)	Urban Fire and Explosion (M)
Centre	I	I	I	I	NC	I	I	I	I	I	I	I	I	NC	NC	NC	I	I	I	I	I	I	I	I	I	I
Lower Bald Eagle Valley	D	D	D	D	NC	D	D	D	D	D	D	D	D	D	D	D	D	D	D	NC	D	D	D	D	D	D
Nittany Valley	I	I	I	I	NC	I	I	I	I	I	I	I	I	NC	NC	I	I	I	I	I	NC	I	I	I	I	I
Moshannon Valley	NC	I	I	NC	NC	NC	NC	I	NC	NC	NC	I	NC	NC	NC	I	NC	NC	NC	NC	NC	I	NC	NC	NC	I
Mountaintop	D	D	D	D	NC	NC	D	D	D	D	D	D	D	I	I	NC	I	D	D	NC	D	D	D	D	D	D

Table 4.4-9: Effects of Potential Population, Land Use, and Development Changes on Hazard Impacts by Planning Region

PLANNING REGION	Flood, Flash Flood, Ice Jam (N)	Pandemic and Infectious Disease (N)	Transportation Incidents (M)	Winter Storm (N)	Substance Use Disorder (M)	EH - Hazardous Materials Release (M)	Drought (N)	Utility Interruption (M)	Tornado, Windstorm (N)	Extreme Temperature (N)	Hurricane, Tropical Storm, Nor' easter (N)	Terrorism (M)	Subsidence, Sinkhole (N)	EH - Conventional Oil and Gas Wells (M)	EH - Unconventional Oil and Gas (M)	EH - Coal Mining (M)	EH - Gas and Liquid Pipelines (M)	Cyber Terrorism (M)	Dam Failure (M)	Wildfire (N)	Nuclear Incidents (M)	Civil Disturbance (M)	Landslide (N)	Earthquake (N)	Radon Exposure (N)	Urban Fire and Explosion (M)
Penns Valley	I	I	I	I	NC	I	I	I	I	I	I	I	I	NC	NC	NC	I	I	I	I	NC	I	I	I	I	I
Upper Bald Eagle Valley	D	D	D	D	NC	D	D	D	D	D	D	D	D	NC	NC	NC	NC	D	D	D	D	D	D	D	D	D

I = Increase, NC = No Change, D = Decrease

4.4.4 Community Survey

A community-wide survey was conducted to help understand the on-the-ground conditions and concerns of Centre County residents, therefore supporting the assessment of hazard risk and mitigation opportunities in the County. The survey asked respondents two types of questions: mitigation activities completed within the household and hazard concerns. Over 200 county residents took the survey with the largest cohort of respondents coming from those who live within Patton Township and Millheim Borough.

Currently, 90% of respondents are homeowners and all have homeowner's insurance. Almost all renters have rental insurance. However, when it comes to ensuring homes against any type of flooding, only 4% of individuals within the County have flood insurance, despite Centre County lying within the Susquehanna River Basin, one of the most flood-prone river basins in the nation. Other household preparedness and mitigation efforts included discussing what to do in the case of an emergency (51%) and putting together an emergency kit (31%). However, a third of respondents reported that they have done nothing to prepare for a potential hazard. This provides a good opportunity for public education training related to risk, mitigation, and preparedness with more than two-thirds of residents reporting they have some level of interest in attending a municipally-led hazard mitigation-related event.

Respondents were asked about how informed they are when it comes to the most pressing hazards within Centre County, and about half (47%) reported that there is a lot of information on the risk of hazards affecting their community that they are most likely unaware of. Many (42%) stated they were somewhat informed, while only 8% viewed themselves as very informed. The top reported hazards of concern included winter storms (60%), utility interruption (57%), flooding (44%), and subsidence and sinkholes (44%). Both for information on preparedness and potential hazard risk, email (newsletter or new blasts), municipal websites, and social media are the most desired. Additional ideas from residents included text messages and alerts.

5. CAPABILITY ASSESSMENT

5.1 UPDATE PROCESS SUMMARY

The purpose of the Capability Assessment is to identify strengths and weaknesses that will affect the ability of the County and participating jurisdictions to implement mitigation actions. It is important to perform a mitigation capability assessment in order to develop a comprehensive and implementable mitigation strategy. Capabilities include a variety of regulations, existing planning mechanisms, and administrative capabilities provided through established agencies or authorities. This assessment will allow Centre County to better evaluate its current resources to implement its mitigation strategy to address the potential hazards which make the County and its local municipalities vulnerable. While the capability assessment serves as a good instrument for identifying local capabilities, it also provides a means for recognizing gaps and weaknesses that can be resolved through future mitigation actions. The results of this assessment lend critical information for developing an effective mitigation strategy.

The 2004 HMP identified the presence of local plans, ordinances, and codes in each municipality. It also specified local, state, and federal resources available for mitigation efforts. Through responses to the Capability Assessment Survey distributed to all municipalities and input from the HMSC, the 2010 HMP provided an updated inventory of the most critical local planning tools available and a summary of the fiscal and technical capabilities available through programs and organizations outside of the County. It also identified emergency management capabilities and the processes used for administering the NFIP. The 2015 HMP provided an update to the 2010 findings, through data collected from the County and participating municipalities. The 2021 Capability Assessment provided an updated inventory of local planning and regulatory tools available, a summary of fiscal and technical capabilities, and discussed opportunities to integrate the HMP into other plans and programs to promote implementation. This 2025 update does the same.

To accomplish this, a number of documents were reviewed as part of this Plan Update. While some information has been derived from the 2010, 2015, and 2021 Plans and updated where applicable, additional documents have been identified and reviewed for purposes of integration into other local planning mechanisms. Several plans and ordinances at the County and municipal levels were reviewed, and a summary of options to integrate the data, information, and hazard mitigation goals and actions into other planning mechanisms is provided. Assessment forms were distributed to all municipalities for them to report on their current capabilities. The rest of this section will highlight capabilities but is not meant to be an exhaustive list. Returned assessment forms can be found in Appendix C.

The Mitigation Strategy, including the goals and actions, should be incorporated into relevant planning mechanisms based on their pertinence and relevance to specific plans and ordinances. For example, all structural projects should be included in the Capital Improvement Program. Land use and zoning related projects should be incorporated into the next update of the Community's Comprehensive Plan and Zoning Ordinance through collaboration with Planning and Zoning departments. Likewise, information from relevant planning documents was used to inform and update the Hazard Mitigation Plan. A general list of relevant plans and documents and corresponding areas for incorporation are listed below:

Table 5.1-1: Relevant Departments and Documents

RELEVANT DOCUMENTS	HAZARD MITIGATION PLANNING ELEMENTS
Comprehensive Plan/Land Use Plan, Zoning/Subdivision Regulations, Floodplain Ordinance	Demographic data, land use, development trends, and floodplain management information
Stormwater Management Plan, Sediment and Erosion Control Plan, Long Range Transportation Plan	Stormwater management and infrastructure data and projects
Evacuation Plan, Emergency Operations/Response Plan	All-hazards information for evacuation, response, and recovery
Climate Action Plan, Dam Safety Regulations	Risk and vulnerability data, and storm/floodwater management
Recreation and Greenway Plan	Land preservation strategies

5.2 CAPABILITY ASSESSMENT FINDINGS

Centre County and participating jurisdictions have a wide variety of plans, tools, and resources in place to support the goals of hazard mitigation planning, and the specific mitigation strategy presented in this HMP Update.

5.2.1 Planning and Regulatory Capability

The purpose of a plan/ordinance review as part of this planning process is trifold:

- To identify existing Commonwealth, Regional/County, and Municipal initiatives;
- To provide an inventory and review of sample plans and ordinances and identify sections in these documents that address hazard mitigation-related issues; and
- To provide a platform to integrate plans and other documents so recommendations and strategies are not in contradiction with one another (e.g., between the hazard mitigation plan and the comprehensive plan).

A review of current zoning and subdivision ordinances, comprehensive plans, open space and recreation plans, stormwater management plans, sediment and erosion

control plans, and emergency operations plans, among others, are summarized below by level of administration (Commonwealth, Regional/County, and Municipal).

COMMONWEALTH OF PENNSYLVANIA DOCUMENT REVIEW

- The 2023 Pennsylvania State Hazard Mitigation Plan Update goals and objectives that are applicable to this Centre County Plan Update including (PEMA, 2023):
    - Protect lives, property, environmental quality, and resources of the Commonwealth;
    - Enhance consistent coordination, collaboration, and communications among stakeholders;
    - Provide a framework for active hazard mitigation planning and implementation; and
    - Increase awareness, understanding, and preparedness across all sectors.

  Hazard identification and risk assessment data from the 2023 Pennsylvania State Hazard Mitigation Plan Update has been incorporated into the appropriate sections of this Plan Update.
- The Uniform Construction Code (UCC) is the statewide building code (Act 45 of 1999) that took effect in Pennsylvania in April of 2004 and was amended most recently in 2018 The UCC is mandated by the State for all municipalities in Pennsylvania and establishes minimum regulations for most new construction, including additions and renovations to existing structures. All new construction is required to meet the UCC requirements statewide. On October 26, 2022, the Commonwealth Court issued an opinion that ceased enforcement of 2021 accessibility standards, meaning all structures must comply with the 2018 accessibility requirements (Department of Labor & Industry, n.d.). All 35 municipalities in Centre County have since adopted these building codes (see Commonwealth of Pennsylvania Document Review, Bullet "B"). Residential construction in Centre County is also regulated by the International Residential Code (IRC), which was most recently updated in 2021. The IRC regulates the construction, alteration, movement, enlargement, replacement, repair, renovation, and demolition of one- or two-family dwellings and townhouses not more than three stories above grade in height. Building codes relate to hazard mitigation through requirements about building materials and methods that have been professionally evaluated for quality and safety, as well as inspection requirements. Municipalities have the option to adopt more stringent requirements that enhance resistant or resilience building design practices.
- The Commonwealth of Pennsylvania Governor's Executive Order 1999-1 (Land Use Planning) provides the basis for the requirement to integrate hazard mitigation into comprehensive land use planning. As part of this executive order,

the Interagency Land Use Team was established, comprising the following state agencies: Department of Agriculture; Department of Community and Economic Development; Department of Conservation and Natural Resources; Department of Environmental Protection; Governor's Green Government Council; Fish and Boat Commission; Game Commission; Department of Transportation; and PEMA. One of the most significant outcomes of PEMA's participation on the team is the integration of hazard mitigation goals and objectives into comprehensive land use planning processes.

- The Pennsylvania Erosion and Sediment Control Code requires all earthmoving projects in the Commonwealth to develop an erosion and sediment pollution control plan to ensure that proper site development practices are employed for land development and implement best management practices for the control of sediment pollution during construction. Pennsylvania DEP requires a National Pollution Discharge Elimination System (NPDES) permit for earthmoving activities exceeding one acre. As well as erosion and sediment pollution control during construction, the permit also addresses post-construction stormwater management.
- Act 165: Hazardous Materials Emergency Planning and Response Act, amended in 2001, established a statewide hazardous materials safety program. This created the Hazardous Materials Response Fund, county Hazardous Material Emergency Response Accounts, and further provided duties to PEMA and the Pennsylvania Emergency Management Council. This Act requires facilities with extremely hazardous chemicals on site to create Off-site Emergency Response Plans, which are then presented to Local Emergency Planning Committees.

REGIONAL/COUNTY DOCUMENT REVIEW

- Phase I of the Centre County Comprehensive Plan was adopted in 2003. A comprehensive plan is a policy document identifying community goals and objectives for future growth and development. In Centre County, this is the policy basis for zoning decisions and other land development policies countywide. Phase II is currently underway which involves developing Implementation Strategies for the goals and objectives, as well as updating sections of the Comprehensive Plan as necessary. Since the 2015 Update, ten implementation strategies and chapter updates have been published, covering topics including Land Use (2016), Energy Conservation (2016), Public Safety (2017), Communications and Information Technology (2018), and Agriculture (2020). The County is looking to update the comprehensive plan in the coming years.

- The Centre County Long Range Transportation Plan (LRTP) is the official transportation plan for the metropolitan area. LRTPs are used to guide a region's planning for a 20-year horizon. The LRTP documents current and future transportation demand and identifies long-term improvements and projects to meet those needs. The current long-range plan, LRTP 2050, was adopted in September 2020 (CCMPO, 2020a).
- Currently, Centre County Metropolitan Planning Organization (MPO) is developing the Centre County Active Transportation Plan. This plan has a long-term goal of aiding communities and municipalities in establishing transportation routes that connect people to everyday destinations and expand opportunities for physical activity and improve public health. The process included engaging the public, reviewing existing conditions, and developing a list of possible future projects that will improve conditions for bikes, pedestrians, and wheels (Centre County MPO, 2024). The plan was adopted on November, 26 2024.
- The Centre County Recreation and Greenway Plan, 2009, was developed to assist with creating a countywide network of greenways for both human activity and natural infrastructure. This plan looks at land resources and identifies areas offering opportunities for preserving and protecting natural resources (CCPCDO, 2009).
- After FEMA provides a municipality with regulatory flood hazard information, they are required to adopt a floodplain ordinance that meets or exceeds the minimum NFIP requirements in order to participate in the NFIP. The purpose of these overriding regulations is to ensure that participating communities take flood hazard data into account when acting on land use and management. Floodplain ordinances in Centre County are included in the zoning ordinances of individual municipalities. The required free board is 1.5 feet above base flood elevation and no building permits are issued for structures in the floodway. Elevation certificates are required by all municipalities for structures in the floodplain. More on floodplain ordinance administration can be found below in *Section 5.2.1.3*.
- Subdivision and land development ordinances are intended to regulate the development of housing, commercial, industrial, or other uses, including associated public infrastructure, as land is subdivided into buildable lots for sale or future development. Within these ordinances, guidelines on how land will be divided, the placement and size of roads and the location of infrastructure can reduce exposure of development to hazard events. Zoning and Subdivision regulations are administered similarly through the Zoning Ordinance and the Centre County Subdivision and Land Development Ordinance (SALDO)

(CCPCDO, 2018). Communities can elect to opt-in and have the community administer their zoning and subdivision regulations or opt out and develop their own zoning and subdivision ordinance. While the County has no control over the municipalities that have their own zoning ordinances, these municipalities still must meet the Act 247 guidelines – State Municipal Planning Code.

  - The CCPCDO oversees the administration of subdivision regulations for 25 of the County's municipalities under the Centre County SALDO. Ten municipalities in the County administer their own Subdivision Ordinances.
  - 28 municipalities in the County have adopted and enforce a zoning ordinance. Zoning in all remaining municipalities is managed through the County's SALDO, which is not done through traditional zoning regulations and only those specific to SALDO standards and provisions. The County does not dictate use in those remaining municipalities that do not enforce zoning.
    - 20 of these municipalities specifically regulate development of activities in forested lands and provide future land use controls in these areas. Current forest zoning district in the county can be seen in Figure 5.2-1.
    - Three municipalities – Ferguson and Patton Township – regulate development near mountain ridges through the use of special overlay zoning districts. These are defined to meet each municipality's current and future development challenges; generally steering development away from steeply sloped lands. Harris Township has slope development standards incorporated into our Natural Areas district. Ridge overlay districts and ridge locations in Centre County can be seen in Figure 5.2-2.

- Stormwater Management Plans are prepared to comply with the Pennsylvania Stormwater Management Act (Act 167). These plans are intended to improve stormwater management practices, mitigate potential negative impacts from future land uses, and to improve the condition of impaired waterways. This type of plan provides local ordinances that incorporate standards and criteria to manage and maintain peak runoff flows throughout the combined watersheds as development occurs. Stormwater Management Plans exist for five watersheds in Centre County:
  - Spring Creek Watershed (2002)
  - Fishing Creek/Cedar Run Watershed (1995)
  - Buffalo Creek Watershed (1998)
  - Kishacoquillas Creek Watershed (2003)
  - White Deer Watershed (2003)

Figure 5.2-1: Centre County Forest Zoning Districts (CCPCDO, 2013)

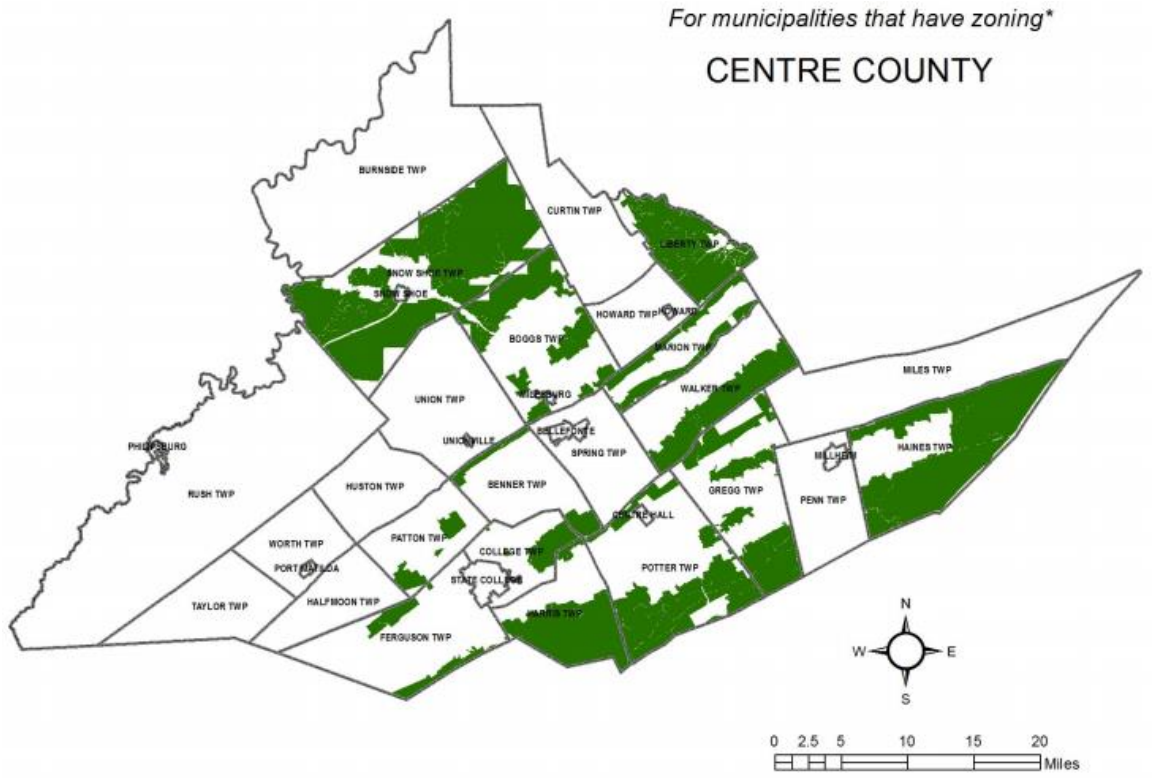
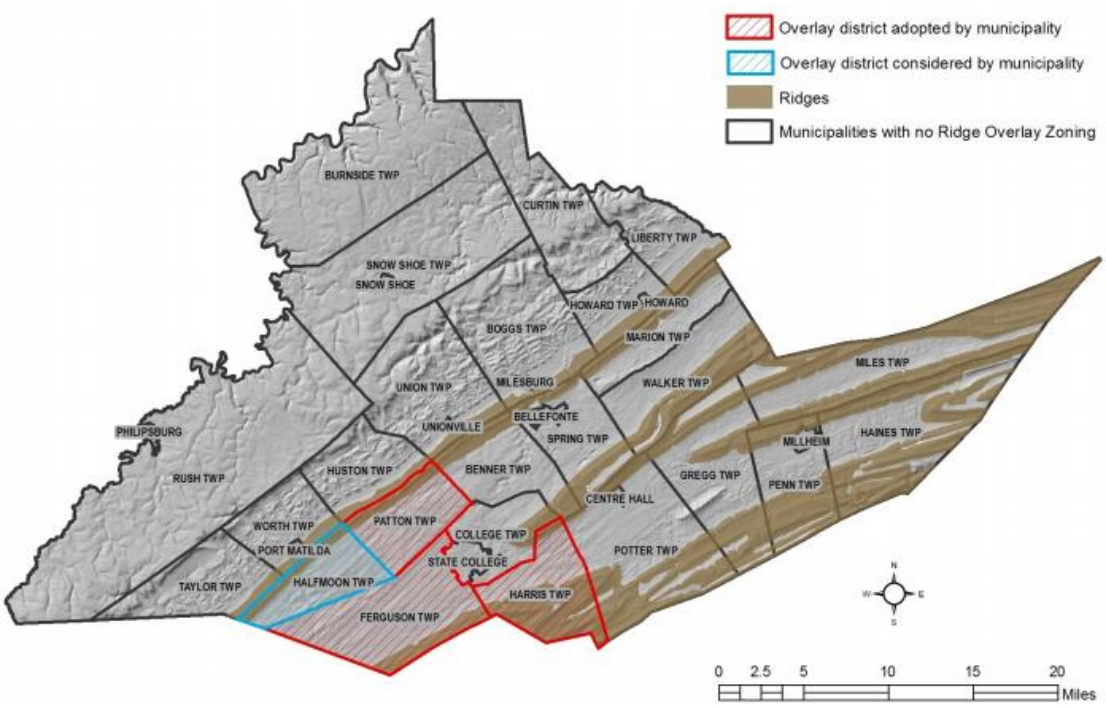


Figure 5.2-2: Centre County Municipalities with Ridge Overlay Districts (CCPCDO, 2013)



- Watersheds in the county with detailed analyses conducted under past Act 167 Plans have specific regulations for stormwater management. All municipalities are required to adopt the model ordinance or amend existing ordinances to be consistent with the standards and criteria set forth in the Plan. If municipalities do not have the capabilities to review plans for consistency with the standards and criteria set forth in the Plan, they will be responsible to designate a representative organization that can complete the review on the municipality's behalf. A total of 16 out of 35 municipalities have a stormwater ordinance in place (see Table 5.2-3). However, Centre County has a stormwater management requirement in its SALDO, which applies to the other 19 municipalities. It appears that outside of the Centre and Penns Valley planning regions, many municipalities within the County do not have an adopted stormwater management plan.
- Centre County finalized their Countywide Action Plan in February 2021 as part of their commitment to the Pennsylvania Department of Environmental Protection's Phase III Watershed Implementation Plan (WIP). This action plan provides a roadmap for the county and partners to reach clean water goals, including pollution reduction, quality of life improvements, and addressing flooding. The county worked with over 50 local stakeholders to identify four major priorities and develop 54 actions.
- Sediment and Erosion Control Regulations are administered by the Centre County Conservation District, on behalf of the PA Department of Environmental Protection (PA DEP). Municipalities that administer their own SALDO are responsible for including stormwater regulations in the SALDO. The level of enforcement of these regulations varies by municipality and is based on staff availability and technical capability. If a project requires a sediment and erosion control permit, a plan is required to be submitted (Centre County Conservation District, 2020).
- The Centre County Emergency Operations Plan (EOP) was updated in 2016, reviewed in 2018, and updated again in 2021. This plan prescribed emergency response coordination guidelines for the County, serving as an emergency management link between local municipalities and state government while incorporated the federal organizational concepts of the National Response Framework (NRF). The Emergency Management Services Code (PA Title 35) requires that all municipalities in the Commonwealth have a Local EOP which is reviewed every two years. All municipalities in Centre County have a local EOP. Additionally, Penn State University has a Comprehensive Emergency Management Plan (CEMP) that was updated in 2022. Centre County operates emergency services through the Emergency Communications Center. The

County Emergency Services website includes listings for resources available from County assets. The CEMP outlines the most critical elements of the university's emergency management plan to inform the public on general processes at the school, and to provide a foundation upon which other universities can build their campus specific plans.

- Emergency Action Plans have been prepared for high hazard dams located in Centre County as well as those for which the inundation area includes part of Centre County. Each Emergency Action Plan addresses ways to safeguard lives and reduce property damage within the inundation area; procedures for effective dam surveillance; procedures for prompt notification of emergency management officials; warning and evacuation procedures; and emergency response actions that will be taken in the event of potential or imminent failure of the dam. Plans are typically prepared by dam owners and are reviewed by Centre County officials. Plans are not available to the public because they include sensitive information.
- The Centre County 911/Emergency Communications Standard Operating Procedures was revised in January 2017. This plan includes an EMS System Response Plan. The goal of the countywide response plan is to expedite responses by eliminating the delay of any agency that has low staffing and who will not be able to crew when being requested by the center for response to a 911 initiated call received through Centre County Emergency Communications Center.
- Penn State University published its most recent strategic plan, Our Commitment to Impact – 2016-2025, in 2015. One thematic priority in the plan is enhancing health on campuses and surrounding communities. The university plans to meet community health goals through collaborative partnerships and by informing government health policy. Phase two of the plan began in fall 2024 with the presentation of preliminary proposals of an institutional plan. Five working groups have developed draft documents consisting of objectives, strategies, and measure of progress, one for each goal of the plan.
- CCMPO updated its Coordinated Public Transit – Human Services Transportation Plan in 2012 (CCMPO, 2012). SEDA-COG published their most recent Coordinated Public Transit Plan in 2019 (SEDA-COG, 2019). These plans identify the transportation needs for individuals with disabilities, older adults, and people with low incomes and provide strategies for accommodation. During hazard response, these populations should be prioritized for assistance in evacuations.

- The county published a 2023 Housing Needs Assessment after studying the existing conditions and trends in the housing market and identifying the most prominent factors impacting it. The study included a demographic analysis, a housing inventory, and a gap analysis. Factors identified included increasing construction costs, rising prices and mortgage rates, the student rental market, zoning, public opposition to higher density, and the high cost of land.
- The Centre County Broadband Strategic Plan was published in 2023 after two years of studying the existing infrastructure and context of unserved and underserved areas in the county. The study revealed that nearly 8,000 addresses were unserved or underserved and that cable infrastructure improvements are needed to meet these needs and speed and reliability standards. Recommendations from the study included taking a countywide approach to anticipating funding opportunities, consider issuing a request for proposal, set aside funds to match private investment, and continue communication with the State Broadband Development Authority.

LOCAL/MUNICIPAL DOCUMENT REVIEW

- Centre County is split into seven Planning Regions, as shown in Figure 2.2-1. CCPCDO works with each regional planning agency to develop comprehensive plans in these regions. To date, three regions have developed comprehensive plans: Centre Region (2013), Nittany Valley Region (2019), and Penns Valley Region (2006).
- The Centre Regional Planning Agency (CRPA) provides regional and local planning services to municipalities in the Centre Region: College Township, Ferguson Township, Halfmoon Township, Harris Township, Patton Township, and State College Borough. This is primarily through the development of small area plans that establish a long-range vision to guide the future growth and development of specific areas. Plans are then adopted and implemented by local municipalities. The following table lists these plans:

Table 5.2-1: Small Area Plans Developed by the CRPA

YEAR OF ADOPTION	PLAN TITLE	AREA COVERED
2008	The State College Land Area Plan	Borough of State College and parts of College and Ferguson Townships
2012	The Halfmoon and Patton Township Area Plan	Halfmoon and Patton Townships
2016	Boalsburg Small Area Plan	Boalsburg area in Harris Township

Table 5.2-1: Small Area Plans Developed by the CRPA

YEAR OF ADOPTION	PLAN TITLE	AREA COVERED
2018	Halfmoon Township Small Area Plan	The designated mixed-use area in the eastern part of Halfmoon Township
2019	Ferguson Township – Pine Grove Mills Small Area Plan	The Pine Grove Mills area in Ferguson Township

- Centre Region Council of Governments published a regional Climate Action and Adaptation Plan (CAAP) for the six municipalities in the Centre Region in November 2021. The plan identified local challenges from more frequent and severe storms and increasing temperatures, analyzed the economic, social, and environmental impacts, and created a goal of reducing community-wide greenhouse gas emissions by 45% by 2030. This planning process led to 82 actions that relate to energy and buildings, renewable energy, sustainable transportation, solid waste, land management, and clean healthy water. The plan also includes information on monitoring progress and funding opportunities.
- The Nittany Valley Region adopted its most recent Comprehensive Plan Update in 2019. The Nittany Valley planning region covers Bellefonte Borough, Benner Township, Marion Township, Spring Township, and Walker Township. The plan identifies future land use goals for the area, as well as gaps in local emergency response services. Future land use maps identify conservation areas where development is limited, as well as mines and quarries which should have ongoing monitoring to prevent environmental hazards.
    - While County governments are required by law to adopt a Comprehensive Land Use Plan, this is optional for local municipalities. All but three municipalities in Centre County have adopted comprehensive land use plans (*the Brough of Unionville, Township of Curtin, and the Township of Taylor*).
- Bellefonte Borough developed a Climate Action Plan (CAP) in 2020. Similar to the Centre Region CAAP, the Bellefonte Borough CAP looks to mitigate greenhouse gas emissions. Bellefonte identifies a number of mitigation objectives and actions to move towards this goal (Bellefonte Borough, 2020). As of 2024, the plan's adoption was reversed by the borough council.
- College Township is currently developing a Dale Summit Redevelopment Plan, which comes after their Dale Summit Area Plan from 2021. The Area Plan was also updated in 2023. The Area Plan included analysis on current conditions and then identified future goals for the Dale Summit neighborhood. The

Redevelopment Plan will provide more detailed planning on reshaping the neighborhood through strategic regulations and investments to achieve goals.

- The Public Works and Planning & Zoning Departments in Ferguson Township drafted an amendment to the Township's SALDO to establish a new Tree Preservation section. The ordinance will only apply to trees during land development and not existing properties in Ferguson. The ordinance will provide incentives to developers that plan additional trees in their developments (Ferguson Township, 2020). Tree preservation is a nature-based solution that can help manage stormwater and mitigate flood impacts.
- Halfmoon Township created an Open Space Preservation Board in 1999 to acquire and manage open space properties in the municipality. This has resulted in a variety of conservation projects. In between 2006 and 2011, 25 new properties with 1,776 acres were conserved (Halfmoon Township, n.d.).
- Centre County municipalities use additional planning and regulatory controls:
  - 11 municipalities have regulations to require parkland designation for applicable residential development.
  - 17 municipalities have purchased easements through the County's Agricultural Land Preservation Board in locations identified as Agricultural Security Areas.
  - 15 municipalities have adopted stormwater management ordinances. 19 of the remaining municipalities are regulated by Centre County's stormwater management requirements in its SALDO. Rush Township is regulated under its own municipal SALDO (Centre County, 2022).

Table 5.2-3 includes the regulatory capabilities that were identified by the municipalities during the planning process, as well as through Centre County records. The different levels of floodplain ordinance regulations are defined in section 5.2.1.1. All 35 communities in Centre County have adopted a building permit ordinance. Most municipalities have their own planning commissions. Any municipality without one is supported through CCPCDO. A few municipalities have adopted additional ordinances supporting hazard mitigation and environmental resilience.

- Gregg Township, Haines Township, Halfmoon Township, Howard Borough, Patton Township, Penn Township, Penn State University have all adopted Natural Resources Protection Plans.
- Centre Hall Borough, Ferguson Township, Gregg Township, Haines Township, Millheim Borough, Penn Township, Snow Shoe Township, and Penn State University have adopted Emergency Operations Plans that include Evacuation Plans and Continuity of Operations Plans.

Table 5.2-2: Summary of Planning Tools Adopted by Each Municipality in Centre County (Centre County, 2022b)

COMMUNITY	LEVEL OF FLOODPLAIN ORDINANCE REGULATIONS	ADOPTED COMPREHENSIVE PLAN	PLANNING COMMISSION	MUNICIPAL SALDO APPLIES	COUNTY SALDO APPLIES	ZONING ORDINANCE	PARKLAND DEDICATION ORDINANCE	AGRICULTURE SECURITY AREA	STORM-WATER ORDINANCE
Centre County	N/A	X	X		X				X
Centre Planning Region									
College Township	D	X	X	X		X	X	X	X
Ferguson Township	C	X	X	X		X	X	X	X
Halfmoon Township	B	X	X	X		X	X	X	X
Harris Township	D	X	X	X		X	X	X	X
Patton Township	B	X	X	X		X	X	X	X
State College Borough	C	X	X	X		X	X		X
Lower Bald Eagle Valley Planning Region									
Boggs Township	D	X			X	X			X
Curtin Township	C				X				
Howard Borough	C	X	X		X	X			
Howard Township	C	X			X				
Liberty Township	C	X	X	X		X			X
Milesburg Borough	D	X	X		X	X			
Nittany Valley Planning Region									
Bellefonte Borough	C	X	X	X		X			X
Benner Township	D	X	X		X	X		X	X
Marion Township	C	X	X		X	X	X	X	X
Spring Township	D	X	X	X		X	X	X	X
Walker Township	C	X	X		X	X	X	X	X
Moshannon Valley Planning Region									

Table 5.2-2: Summary of Planning Tools Adopted by Each Municipality in Centre County (Centre County, 2022b)

COMMUNITY	LEVEL OF FLOODPLAIN ORDINANCE REGULATIONS	ADOPTED COMPREHENSIVE PLAN	PLANNING COMMISSION	MUNICIPAL SALDO APPLIES	COUNTY SALDO APPLIES	ZONING ORDINANCE	PARKLAND DEDICATION ORDINANCE	AGRICULTURE SECURITY AREA	STORM-WATER ORDINANCE
Philipsburg Borough	C	X	X		X	X			
Rush Township	C	X	X	X		X			
Mountaintop Planning Region									
Burnside Township	B	X			X				
Snow Shoe Borough	N/A	X	X		X	X			
Snow Shoe Township	C	X			X	X			
Penns Valley Planning Region									
Centre Hall Borough	A	X	X		X	X			
Gregg Township	B	X	X		X	X	X	X	X
Haines Township	D	X	X		X	X		X	
Miles Township	B	X			X			X	
Millheim Borough	C	X	X		X	X			
Penn Township	D	X	X		X			X	
Potter Township	B	X	X		X	X	X	X	X
Upper Bald Eagle Valley Planning Region									
Huston Township	C	X	X		X	X		X	
Port Matilda Borough	C		X		X	X			
Taylor Township	B				X			X	
Union Township	C	X	X		X				
Unionville Borough	C	X			X	X			
Worth Township	C	X	X		X	X		X	

5.2.1.1 Participation in the National Flood Insurance Program

The Pennsylvania Floodplain Management Act (Act 166 of 1978) requires every municipality with flood hazard areas identified by FEMA to participate in the NFIP and permits all municipalities to adopt floodplain management regulations. It is in the interest of all property owners in the floodplain to keep development and land use within the scope of the floodplain regulations for their community. This helps keep insurance rates low and makes sure that the risk of flood damage is not increased by property development.

FEMA Region 3 makes available to communities an ordinance review checklist which lists required provisions for floodplain management ordinances. This checklist helps communities develop an effective floodplain management ordinance that meets federal requirements for participation in the NFIP. The Pennsylvania Department of Community and Economic Development (DCED) provides communities with a suggested ordinance document to assist municipalities in meeting the minimum requirements of the NFIP and the Pennsylvania Flood Plain Management Act (Act 166), based on their 44 CFR 60.3 level of regulations. As new Flood Insurance Rate Maps (FIRMs) are published, the Pennsylvania State NFIP Coordinator at DCED works with communities to ensure the timely and successful adoption of an updated floodplain management ordinance by reviewing and providing feedback on existing and draft ordinances. In addition, DCED provides guidance and technical support through Community Assistance Contacts (CAC) and Community Assistance Visits (CAV).

As stated in Section 4.3.4, 34 of 35 municipalities in Centre County participate in the NFIP. Table 5.2-3 shows whether the municipality is participating in the NFIP, whether the municipality is in good standing, the number of policies they have, and the total amount of premium and coverage for each municipality.

Table 5.2-3: Centre County NFIP Information by Municipality (FEMA PIVOT, 2025)

COMMUNITY	PARTICIPATION STATUS	COMMUNITY IN GOOD STANDING	FIRM DATE	POLICIES IN FORCE	TOTAL COVERAGE	TOTAL ANNUAL PAYMENT
Bellefonte Borough	Participating	Yes	1/16/2015	8	$2,800,000	$31,251
Benner Township	Participating	Yes	1/16/2015	5	$964,000	$6,976
Boggs Township	Participating	Yes	05/04/2009	32	$6,539,000	$49,229
Burnside Township	Participating	Yes	05/04/2009	0	$0	$0
Centre Hall Borough	Participating	Yes	05/04/2009	0	$0	$0
College Township	Participating	Yes	05/04/2009	20	$5,675,000	$31,153
Curtin Township	Participating	Yes	05/04/2009	5	$743,000	$6,435
Ferguson Township	Participating	Yes	05/04/2009	18	$5,119,000	$13,850

Table 5.2-3: Centre County NFIP Information by Municipality (FEMA PIVOT, 2025)

COMMUNITY	PARTICIPATION STATUS	COMMUNITY IN GOOD STANDING	FIRM DATE	POLICIES IN FORCE	TOTAL COVERAGE	TOTAL ANNUAL PAYMENT
Gregg Township	Participating	Yes	05/04/2009	11	$1,765,000	$20,915
Haines Township	Participating	Yes	05/04/2009	8	$1,518,000	$13,834
Halfmoon Township	Participating	Yes	05/04/2009	6	$1,381,000	$5,502
Harris Township	Participating	Yes	05/04/2009	6	$1,620,000	$7,344
Howard Borough	Participating	Yes	1/16/2015	0	$0	$0
Howard Township	Participating	Yes	1/16/2015	1	$250,000	$873
Huston Township	Participating	Yes	05/04/2009	5	$763,000	$5,469
Liberty Township	Participating	Yes	1/16/2015	10	$946,000	$13,200
Marion Township	Participating	Yes	1/16/2015	0	$0	$0
Miles Township	Participating	Yes	05/04/2009	3	$382,000	$3,616
Milesburg Borough	Participating	Yes	05/04/2009	27	$4,521,000	$48,539
Millheim Borough	Participating	Yes	05/04/2009	18	$2,627,000	$41,150
Patton Township	Participating	Yes	05/04/2009	13	$4,328,000	$7,329
Penn Township	Participating	Yes	05/04/2009	9	$1,082,000	$12,849
Philipsburg Borough	Participating	Yes	05/04/2009	11	$1,924,000	$18,247
Port Matilda Borough	Participating	Yes	05/04/2009	8	$981,000	$15,434
Potter Township	Participating	Yes	05/04/2009	4	$900,000	$4,903
Rush Township	Participating	Yes	05/04/2009	26	$3,861,000	$31,922
Snow Shoe Borough	Participating	Yes	05/04/2009	0	$0	$0
Snow Shoe Township	Participating	Yes	05/04/2009	4	$738,000	$3,132
Spring Township	Participating	Yes	1/16/2015	29	$7,431,000	$52,191
State College Borough	Participating	Yes	05/04/2009	12	$3,659,000	$8,881
Taylor Township	Participating	Yes	05/04/2009	5	$1,143,000	$6,178
Union Township	Participating	Yes	05/04/2009	3	$775,000	$3,505
Unionville Borough	Participating	Yes	05/04/2009	2	$88,000	$1,939
Walker Township	Participating	Yes	05/04/2009	7	$1,167,000	$6,600
Worth Township	Participating	Yes	05/04/2009	3	$1,513,000	$6,191
Total				**319**	**$67,203,000**	**$478,637**

Since the 2021 plan update, there have been changes in the number of policies and total premiums and coverage for the county. In 2021, there were 347 policies in force across the county. There are currently 319 policies, a reduction of 28 policies. The total amount for premiums and coverage was $65,504,271 in 2021. It increased to

$67,203,000 in 2025, an increase of $1,698,729. Table 5.2-4 below showcases the changes in coverage for each municipality.

Table 5.2-4: Change in NFIP Policies and Coverage 2020-2025 (FEMA PIVOT, 2025)

COMMUNITY	CHANGE IN POLICIES IN FORCE	CHANGE IN TOTAL COVERAGE
Bellefonte Borough	-1	$130,945
Benner Township	-2	$(360,397)
Boggs Township	-3	$(199,775)
Burnside Township	0	$0
Centre Hall Borough	0	$0
College Township	3	$503,628
Curtin Township	-2	$81,218
Ferguson Township	-4	$(418,547)
Gregg Township	-3	$115,312
Haines Township	1	$234,369
Halfmoon Township	0	$110,034
Harris Township	-1	$(21,716)
Howard Borough	-1	$(28,116)
Howard Township	-1	$88,514
Huston Township	-1	$(27,315)
Liberty Township	-7	$(843,553)
Marion Township	0	$(210,496)
Miles Township	2	$(3,382,262)
Milesburg Borough	1	$1,835,147
Millheim Borough	-6	$(1,901,357)
Patton Township	-5	$2,155,549
Penn Township	-7	$(517,196)
Philipsburg Borough	0	$1,172,975
Port Matilda Borough	4	$(13,521)
Potter Township	0	$(2,076,830)
Rush Township	6	$3,861,000
Snow Shoe Borough	0	$(838,674)
Snow Shoe Township	-2	$738,000
Spring Township	0	$1,237,287
State College Borough	0	$87,551
Taylor Township	0	$21,297
Union Township	0	$(66,317)
Unionville Borough	-1	$(70,901)

Table 5.2-4: Change in NFIP Policies and Coverage 2020-2025 (FEMA PIVOT, 2025)

COMMUNITY	CHANGE IN POLICIES IN FORCE	CHANGE IN TOTAL COVERAGE
Walker Township	2	$292,458
Worth Township	0	$10,418
Total	**-28**	**$1,698,729**

For a community to participate in the NFIP, it must adopt and enforce floodplain management regulations that meet or exceed the minimum NFIP standards and requirements. These standards are intended to prevent loss of life and property, as well as economic and social hardships that result from flooding. Once FEMA provides communities with flood hazard information upon which floodplain management regulations are based, the community is required to adopt a floodplain ordinance that meets or exceed the minimum NFIP requirements. All NFIP participating communities in Centre County have either adopted a stand-alone ordinance or have arranged for County administration of floodplain regulations.

The overriding purpose of the minimum floodplain management regulations as outlined by the Code of Federal Regulations (44 CFR) is to ensure that participating communities consider flood hazards, to the extent that they are known, in all official actions relating to land management and use. Municipalities range from "A" to "E" levels of regulation based on their identified flood zones. The levels are defined as follows:

- A: FEMA has not defined a SFHA in the community.
- B: FEMA has provided a Flood Insurance Rate Map (FIRM) with approximate A Zones.
- C: FEMA has provided a FIRM with base flood elevations.
- D: FEMA has provided a FIRM with base flood elevations and a map that shows a floodway.
- E: FEMA has provided a FIRM with coastal high hazard areas and no floodways.
- D&E: FEMA has provided a FIRM with both floodways and coastal high-hazard areas.

In Centre County, four municipalities have no FEMA identified flood hazard areas, seven are Level "B", 18 are Level "C", and eight are Level "D" indicating that a floodway has been designated for certain flooding sources. Regulations become more comprehensive as you move from A to E and are dependent on whether a municipality

has identified flood hazard areas, flood elevations, floodways, or coastal high-hazard areas.

Table 5.2-5 below showcases the designated individual or agency responsible for implementing the requirements of the NFIP for each municipality.

Table 5.2-5: Floodplain Administrator for Each Municipality (PA DCED, 2025)

COMMUNITY	DESIGNEE OR AGENCY
Bellefonte Borough	Donald Holderman
Benner Township	Michael Lesniak
Boggs Township	David Veneziano
Burnside Township	Wanda Guenot
Centre Hall Borough	Centre Hall Borough Office
College Township	Mark Gabrovsek
Curtin Township	Rick Miller
Ferguson Township	Jeff Ressler
Gregg Township	Mike Lesniak
Haines Township	Chris Dobson
Halfmoon Township	Corey Rilk
Harris Township	Todd Shea
Howard Borough	Cody Strouse
Howard Township	David L. Etters
Huston Township	Karen Dillon-Ballock
Liberty Township	Terry Aument
Marion Township	Timothy E. Weight
Miles Township	Lisa Kroner
Milesburg Borough	P V Code Enforcement Agency
Millheim Borough	Millheim Borough
Patton Township	Amy K. Farkas
Penn Township	Penns Valley Code Enforcement Agency
Philipsburg Borough	Joel Watson
Port Matilda Borough	Ida Lively
Potter Township	Penns Valley Code Enforcement Agency
Rush Township	Dave Jackson
Snow Shoe Borough	Robert Reiter
Snow Shoe Township	George Staco
Spring Township	Vaughn Zimmerman
State College Borough	Eric Brooks

Table 5.2-5: Floodplain Administrator for Each Municipality (PA DCED, 2025)

COMMUNITY	DESIGNEE OR AGENCY
Taylor Township	Penns Valley Code Enforcement Agency
Union Township	Keystone Inspection Agency
Unionville Borough	Penns Valley Code Enforcement
Walker Township	Penns Valley Code Enforcement
Worth Township	Keith Reese

A total of five municipalities submitted the 2025 NFIP Survey. The following information is summarized to document how the County currently assists municipalities in addressing NFIP compliance and requirements:

- The County makes the FIRM and FIS Reports available to the public for review at the County Records Center, located at the Willowbank Building in Bellefonte Borough. The Office serves as the depository for all County plans and ordinances and includes most flood-related information.
- Publication of the effective countywide FIRM occurred on May 4, 2009 and January 16, 2015. Digital flood hazard information provided by FEMA greatly enhances mitigation capabilities as they relate to identifying flood hazards. Residents and municipal officials are provided with mapping assistance from the Centre County GIS Office, CCPCDO, and the Centre County OES upon request.
- As shown in Table 5.2-3, out of 35 total municipalities in the County, 25 are under the jurisdiction of the Centre County SALDO. Ten municipalities administer their own SALDOs. 28 municipalities administer their own zoning codes, while all other communities' zoning is under the jurisdiction of the Centre County SALDO. Local municipalities, not under the jurisdiction of the County, are responsible for all third party Letter of Map Revision (LOMR) requests to either be: 1) submitted to FEMA through the local municipality, or 2) provided with evidence that the local municipality has been notified of the LOMR requests to FEMA. A LOMR is a letter that officially changes the Flood Insurance Rate Map (FIRM).
- Twenty-five municipalities (8 Boroughs and 17 Townships) are under County jurisdiction for subdivision and land development. Centre County does not enforce countywide zoning regulations.
- Several communities that administer their zoning and floodplain regulations locally contract with private consulting firms to support these functions. For

example, Rush Township utilizes an engineering consultant to serve as the local engineer and zoning officer.

- CCPCDO provides advice and guidance to the public regarding elevation certificated and Letter of Map Amendments (LOMAs). A LOMA is an official amendment, by letter, to an effective National Flood Insurance Program (NFIP) map. However, the NFIP is a program administered through FEMA. Through its flood hazard mapping program, FEMA maintains and updates data through FIRMs. Copies of documents that pertain to changing or correcting the FIRM are available through FEMA and are also available in the offices of the local municipalities.
- CCPCDO and Centre County GIS Office provide advice and guidance to the pubic in interpreting the FIRM and flood studies.

In addition, some local ordinances include measures that go beyond the minimum standards and requirements for floodplain management.

- Ferguson Township adopted a Sourcewater Protection Ordinance in 2019 that prohibits new structures in located near municipal wellheads. Their floodplain ordinance also restricts development or construction within 50 feet on the FEMA mapped floodplain.
- Benner Township, Haines Township, Halfmoon Township, and Spring Township prohibit new construction in the SFHA.
- Unionville Borough adopted a Source Water Protection Plan that encourages safer production and storage of chemicals.

Higher standards adopted by municipalities such as freeboard requirements and addressing repetitive loss properties could be eligible for credit under the Community Rating System (CRS). The NFIP's CRS provides discounts on flood insurance premiums in communities that establish floodplain management programs that go beyond NFIP requirements. Under the CRS, communities receive credit for more restrictive regulations; acquisition; relocation, or flood-proofing of flood-prone buildings, preservation of open space; and other measures that reduce flood damage or protect the natural resources and functions in floodplains.

The CRS was implemented in 1990 to recognize and encourage community floodplain management activities that exceed the minimum NFIP standards. Section 541 of the 1994 Act amends Section 1315 of the 1968 Act to codify the CRS in the NFIP, and expands the CRS goals to specifically include incentives to reduce the risk of flood-related erosion and to encourage measures that protect natural and beneficial

floodplain functions. These goals have been incorporated into the CRS, and communities now receive credit toward premium reductions for activities that contribute to them.

Under CRS, flood insurance premium rates are adjusted to reflect the reduced flood risk resulting from community activities that meet a minimum of three of the following CRS goals:

- Reduce flood losses.
- Reduce damage to property.
- Protect public health and safety.
- Prevent increases in flood damage from new construction.
- Reduce the risk of erosion damage.
- Protect natural and beneficial floodplain functions.
- Facilitate accurate insurance rating.
- Promote the awareness of flood insurance.

There are 10 CRS classes that provide varied reduction in insurance premiums. Class 1 requires the most credit points and gives the largest premium reduction; Class 10 receives no premium reduction. CRS premium discounts on flood insurance range from 5 percent for Class 9 communities up to 45 percent for Class 1 communities. The CRS recognizes 18 creditable activities that are organized under four categories: Public Information, Mapping and Regulations, Flood Damage Reduction, and Flood Preparedness.

Currently, no communities in Centre County participate in CRS. CCPCDO conducted an assessment to determine the communities that would benefit most from voluntary participation in the program. To do so, the County examined the following criteria based on data provided by FEMA:

- Number of flood insurances policies in the SFHA,
- Number of structures (as well as percent of uninsured structures) in the SFHA,
- Municipalities with the highest total and average premiums,
- The "insurance gap" or the gap between the flood insurance in force and the market value of properties within a community, and
- Municipalities with the greatest percentage of land in the SFHA.

Figure 5.2-3 lists the outcome of the assessment and target communities for a CRS pilot program in Centre County. As noted in the figure below, a pilot program for the County would focus on the communities that fulfill the most assessment parameters (as outlined above). No update has been made since the 2021 HMP. Anecdotal evidence shows that communities do not have the capacity to administer the CRS program. One hurdle is the need to collect flood elevation certificates for new and substantially improved structures in the SFHA to demonstrate compliance with the community's floodplain ordinance. During the 2015 HMP planning cycle, FEMA Region 3 held a CRS training for local officials in Centre County. Centre County is continuing an ongoing process to find potential ways to participate in the CRS. Officials are currently looking into possibilities of administering the CRS at the County level. This will be dependent on administrative and governmental capabilities.

Figure 5.2-3: Centre County CRS Assessment



Target Communities for a CRS Pilot Program in Centre County based on the assessment parameters.

Municipality	Number of Policies	Number of Structures	Insurance Premiums	Insurance Gap	Coverage in Force	Percent Floodplain	Assessment Criteria
Milesburg	●	●	●		●	●	5
Boggs Twp	●	●	●	●	●		5
Ferguson Twp			●	●	●		3
College Twp				●	●		2
Gregg Twp		●		●			2
Millheim	●		●				2
Spring Twp	●			●			2
Bellefonte			●				1
Harris Twp					●		1
Liberty Twp						●	1
Penn Twp	●						1
Philipsburg						●	1
Port Matilda						●	1
Rush Twp		●					1
Unionville						●	1

Assessment: Focus on those communities that fulfill the most parameters.

For communities that participate in the NFIP, substantial damage determinations are required by local floodplain management ordinances. These provisions must be in place for residents of a community to purchase flood insurance through the NFIP. The determination about whether a structure is "substantially damaged" is made at the local government level, generally by a building official or floodplain manager. Substantial damage applies to a structure in the SFHA for which the total cost of repairs is 50 percent or more of the structure's market value before the disaster occurred, regardless of the cause of damage. This percentage could vary among jurisdictions but must not be below NFIP standards. Preliminary damage assessments conducted by Centre County after a disaster can be used when making substantial damage determinations. If a building within the floodplain is determined to be substantially damaged after a disaster, it will need to be brought into compliance through methods such as elevating the structure and floodproofing utilities. This should be monitored by the local community in order to stay in compliance with the NFIP.

5.2.2 Administrative and Technical Capability

Administrative capability is described by an adequacy of departmental and personnel resources for the implementation of mitigation-related activities. Technical capability relates to an adequacy of knowledge and technical expertise of local government employees or the ability to contract outside resources for this expertise in order to effectively execute mitigation activities. Common examples of skill sets and technical personnel needed for hazard mitigation include: planners with knowledge of land development/management practices, engineers or professionals trained in construction practices related to buildings and/or infrastructure (e.g., building inspectors), planners or engineers with an understanding of natural and/or human caused hazards, emergency managers, floodplain managers, land surveyors, scientists familiar with hazards in the community, staff with the education or expertise to assess community vulnerability to hazards, personnel skilled in GIS, resource development staff or grant writers, and fiscal staff that can handle complex grant application processes.

A variety of administrative capability are established in Centre County and its jurisdictions. These capabilities can support the implementation of mitigation actions that are proposed in this plan. These capabilities include:

- The Centre County Planning and Community Development Office (CCPCDO) provides professional planning services to citizens, communities, and municipalities in Centre County. The office is responsible for carrying out duties set forth in the Pennsylvania Municipalities Planning Code (PA Act 247 of 1968,

amended and reenacted in 2017). Duties related to hazard mitigation planning include:

  - Preparing and updating the Centre County Comprehensive Plan.
  - Administering the County's SALDO, and monitoring municipal SALDO regulations.
  - Administering the Centre County Agricultural Land Preservation Board's PA Agricultural Conservation Easement (PACE) program.
  - Assisting municipalities with preparing, modifying or reviewing plans and ordinances including comprehensive plans, capital improvements, zoning and subdivision ordinances, GIS mapping, and the NFIP.
  - Giving technical planning assistance to the County's seven regional planning areas.
  - Representing the County on various committees, boards, and organizations throughout the county and region.
  - Coordinating with the Centre County GIS Office.
  - Offering technical assistance to public agencies and organizations including grant writing and administration.
  - Providing staff support to Centre County's MPO.

- The Centre County GIS Office performs mapping and spatial database maintenance work for various County departments including Planning, 911, and the Conservation District. The office provides several open data resources for municipalities to use and can assist municipalities in specific projects.

- Transportation planning in the region is conducted through the Centre County Metropolitan Planning Organization (CCMPO). The MPO decides how the Federal and State transportation funds will be allocated in metropolitan region around State College. One of the primary roles and responsibilities of the CCMPO is to develop and update the LRTP, as mandated by federal transportation authorization legislation.

- The Centre County Office of Emergency Services (OES) coordinates countywide emergency management efforts. Each municipality has a designated local emergency management coordinator who possesses a unique knowledge of the impact hazard events have on their community. A significant amount of information used to develop this plan was obtained from the emergency management coordinators. The OES also contains a Local Emergency Planning Committee (LEPC), which is responsible for overseeing Hazardous Materials Response Account and approving Off-site Emergency Response Plans. The LEPC is comprised of staff from Centre County OES, and a variety of volunteers from

agencies including fire companies, local elected officials, transportation officials, county staff, facility representatives, higher education representatives and haz-mat team representatives.

- Centre County 911, or PSAP (public service answering point), serves residents and businesses across the County with various types of emergency and non-emergency situations. This office maintains up to date telephone and mapping systems, and acts as the primary contact for those needing police, ambulance, or fire assistance.
- Centre County Information Technology Services provides county residents and employees access to information and resources and support services. This office can assist municipalities and businesses in upgrading cyber-security and enhancing safety.
- The Centre County Conservation District provides local assistance to individuals and organizations that interact with the County's natural resources. Their mission is to work collectively to sustain and improve natural resources in Centre County.
- The Penn State Extension provides a wide range scientific data and information to individuals, businesses, and communities internationally. Municipalities can work with the Extension to conduct local environmental studies.
- There are a number of watershed associations in the Centre County region:
    - Spring Creek Watershed Association
    - Clearwater Conservancy
    - Trout Unlimited
        - Wood Duck Chapter
        - Spring Creek Chapter
    - Cold Stream Watershed
    - Penns Valley Conservation Association
    - Centre County Chapter of the Senior Environmental Corps
    - Susquehanna Watershed Coalition
    - The Chesapeake Bay Commission
- Clearwater Conservancy operates the Centre County Pennsylvania Senior Environmental Corps (CCPaSEC), which develops and supports teams of senior citizens who gather and publish data on water quality and streams in the County.
- The South Central Mountains Regional Task Force (SCMRTF) is a regional all-hazards emergency preparedness task force for eight counties in Central Pennsylvania: Bedford, Blair, Centre, Fulton, Huntingdon, Juniata, Mifflin, and Snyder. SCMRTF's preparedness activities address planning, prevention, and

response; and enhance regional coordination capabilities in the event of multi-jurisdictional incidents. SCMRTF has three key programs, including developing, training, and exercising specialized response teams to augment first responder efforts; purchasing and providing procedures for the use of interoperable communications; and, planning and exercising for large scale public health events (SCMRTF, 2020). Additionally, SCMRTF places emphasis on collaborating with the private sector to ensure the security and resilience of privately owned businesses and infrastructure, especially those critical to countywide public health and operational continuity such as the energy, telecommunications, food processing, and transportation sectors. Though SCMRTF is an all-hazards group, it began as a counter-terrorism organization and maintains an extensive training program to mitigate the threat of terrorism for local emergency response entities as well as for the private sector.

- The Susquehanna Economic Development Association - Council of Governments (SEDA-COG) is a regional multi-county development agency which, under the guidance of a public policy board, provides leadership, expertise, and services to communities, businesses, institutions, and residents. With their partners, the region's chamber of commerce and industrial development groups, SEDA-COG provides services free of charge to companies in an 11-county service area in Central Pennsylvania.
- Centre County and Penn State University are both certified as StormReady Communities by NWS. The Storm Ready program was established to help local governments improve the timeliness and effectiveness of hazardous weather-related warnings for the public. By participating in this program, local agencies can earn recognition for their jurisdiction by meeting the guidelines established by NWS in partnership with Federal, State, and local emergency management professionals. The certification also makes Centre County and its municipalities eligible for 25 points in the Community Rating System, awarded to local governments that meet the flood threat recognition system.
- The Pennsylvania State Association of Township Supervisors (PSATS) strives to preserve and strengthen township government and to improve involvement for townships in the state. PSATS sponsors training opportunities to provide township officials with the information and skills they need to meet the challenges of township office.
- Penn State University created the International Center for the Study of Terrorism (ICST) in 2006. The mission of ICST is to engage in and promote the scientific study of terrorism and political violence. In doing so, ICST creates

multidisciplinary, cross-national research teams, drawing strongly but not exclusively from the social and behavioral sciences, to respond to needs and opportunities in the broad areas of terrorism and counterterrorism. The overarching goal of ICST is to provide actionable knowledge and a conceptual basis to policy-relevant and operational counterterrorism activity. While this effort is not focused specifically for Centre County, the presence of researchers with such a knowledge base would provide particularly applicable should any incident develop within Penn State's surroundings.

- Centre County has two contracted PEMA certified hazmat teams, Centre Region Hazmat Team and Eagle Towing and Recovery. These teams are essential in response efforts after a hazmat related incident.

Based on assessment results, municipalities in Centre County have moderate to limited administrative and technical staff needed to conduct hazard mitigation-activities. The municipalities vary in staff size, resource availability, fiscal status, service provision, population, overall size, and vulnerability to the profiled hazards. The 15 municipalities that returned assessment forms were more likely to rate their administrative capabilities as limited or moderate, with only three rating them as high. Generally, the municipalities in the northern and western mountainous part of the County and those in the eastern valleys tend to have fewer residents, less staff, and a more limited supply of available resources than those municipalities with higher populations that are located in the central and southern part of the County. Each municipality carries out its own daily operations and provides various community services according to their local needs and limitations. Some of these municipalities have formed cooperative agreements and work jointly with their neighboring municipalities to provide such services as police protection, fire and emergency medical response, solid waste disposal, recreational opportunities, wastewater treatment, water supply management and infrastructure maintenance. Much of the planning, engineering, and land surveying capabilities are provided by consulting firms. All municipalities in the County have an identified emergency management coordinator, although some of these coordinators are responsible for more than one jurisdiction. The current administrative and technical capabilities may create a challenge for some municipalities to expand or improve their current overall capabilities.

State agencies can provide technical assistance for mitigation activities. For example, in 2020, PA DOH helped Centre County open a testing site for COVID-19 response and a secondary site for vaccines. PA DOH also assisted County EMA and local police officials with a site assessment. State agencies that can provide hazard assistance include, but are not limited to:

- Pennsylvania Department of Community and Economic Development;
- Pennsylvania Department of Conservation and Natural Resources;
- Pennsylvania Department of Environmental Protection;
- Pennsylvania Department of Health; and
- Pennsylvania Department of Transportation.

Centre County can also partner with Federal agencies for technical assistance on mitigation activities. These agencies include but are not limited to:

- Federal Emergency Management Agency;
- United States Army Corp of Engineers;
- Department of Housing and Urban Development;
- United States Department of Agriculture;
- Economic Development Administration;
- FEMA's Emergency Management Institute;
- United States Environmental Protect Agency; and
- Small Business Administration.

5.2.3 Financial Capability

A critical part to the implementation of any plan is the financial resources to accomplish the priority projects identified. The implementation of mitigation actions requires time and fiscal resources. While some mitigation actions are less costly than others, it is important that money is available locally to implement policies and projects. Financial resources are particularly important if communities are trying to utilize state or federal mitigation grant funding opportunities that require local-match contributions. Based on the *Capability Assessment Survey* results received, most municipalities within the County perceive fiscal capability to be limited or moderate. No communities listed their fiscal capability as high.

The key factor in determining fiscal capability is to analyze how tight these constraints are. This could involve a detailed auditing process to tally all revenues and expenditures or could involve an assessment of existing financial ratings as identified and reported by the DCED. These ratings can be used as a base indicator of fiscal capability at the municipal level. The Pennsylvania Municipalities Financial Recovery Act (Act 47 of 1987) identified fiscally distressed municipalities based on established criteria. Analysis of the Act 47 fiscally distressed municipality list indicated that none of Centre County's

municipalities were identified as being fiscally distressed according to the established rating criteria.

Though the smaller, less populous municipalities do not have sufficient budgets to do costly mitigation projects without financial assistance, this does not preclude these municipalities from participating in hazard mitigation activities. Cooperative arrangements, coordinated efforts, and resource efficiency may serve as effective avenues for overcoming fiscal constraints and accomplishing hazard mitigation objectives at the local level.

There are also partnering opportunities at the local level. These would include COGs, as with the Centre Region Council of Governments, which represents State College Borough and the townships of College, Ferguson, Halfmoon, Harris, and Patton, and authorities, such as the Spring-Benner-Walker Sewer Authority and the State College Area Municipal Water Authority, among others (CRCG, 2020b).

Support for mitigation planning actions is most often provided by the Commonwealth of Pennsylvania and the Federal Government. Programs that complement Centre County mitigation planning initiatives include the following state and federal programs.

- Pennsylvania administered programs including:
    - Municipal Assistance Program (MAP), which provides grant funds to implement a variety of services and improvements to manage development with intergovernmental strategies.
    - Land Use Planning and Technical Assistance Program, which provides grant funds for the preparation of community comprehensive plans and ordinances to implement them.
    - Flood Mitigation Program (FMP), which provides grants and technical assistance for projects that address flood mitigation.
    - The Growing Green Plus Grants Program is an extension to the Growing Greener Grant Program administered by the PA DEP. Programs covered with these funds are: Growing Greener Watershed Restoration and Protection, Surface Mining Conservation and Reclamation Act Bond Forfeiture, and Abandoned Mine Drainage Set-Aside Grants.
        - In 2019, the Centre County Conservation District was awarded two grants through this program; one for plan development and one for a stream restoration program. The Penns Valley Conservation Association also received a grant to conduct water quality BMPs at Penns Creek Tributaries.

- In 2024, the Spring Creek Chapter of Trout Unlimited received over $300,000 for streambank restoration and reconnection with the floodplain.

- The Environmental Education grant administered by the PA DEP was established by the Environmental Education Act of 1993, which mandates that five percent of all pollution fines and penalties collected annually be set aside for environmental education.
  - Funding through this grant had been awarded to Bald Eagle Area School District (2009, 2012, 2013, 2023), Bellefonte Area School District (2016), the Borough of State College (2011, 2015), Penn State University (2021, 2022), Penns Valley Area School District (2022). These have funded projects such as pond restoration, student experiences in forest management, installation of a geo-exchange system, ecosystem education, installation of watershed educational displays, Climate Change and Watershed Education toolkits, professional development workshops, and climate change curriculum support (PA DEP, 2024).
- The Alternative Fuels Incentive Grant (AFIG) Program was established by the PA DEP in 1992 under Act 166. This program provides funding to create new markets for alternative fuels in Pennsylvania. Municipalities and agencies are eligible to apply for grant funding for alternative fuels through this grant program.
  - In 2022, Patton Township was awarded $7,500 to purchase an electric car for township use.
  - In 2023, Penn State University was awarded over $55,000 to purchase EV vehicles and install 11 chargers to support fleet expansion.
  - Individuals may be eligible for funding through the Alternative Fuel Vehicle Rebate program administered by the PA DEP. The program provides rebates for individuals when purchasing new, pre-owned, and demonstration vehicles that use alternative fuel sources such as hydrogen fuel cells, compressed natural gas, or battery electric. AFV Rebates have been awarded to several individuals in Centre County.
- Pennsylvania Infrastructure Investment Authority (PennVEST) administers a low interest loan and grant program for new construction or improvements to publicly or privately-owned drinking water, storm water,

or sewage treatment facilities, as well as non-point source pollution prevention best management practices (BMPs).

- In 2022, PennVEST provided a $1.1 million loan and $4.8 million grant to Haines-Aaronsburg Municipal Authority to update an existing treatment plant and distribution system. PennVEST also provided a $5.9 million loan to the Walker Township Water Association to construct an above-ground booster station to provide more reliable delivery of potable water. Moshannon Valley Joint Sewer Authority also received a $2.3 million loan to replace a chlorine gas disinfection system.
- In 2023, PennVEST provided a $2.5 million loan to replace 1,320 feet of storm piping, junction boxes, and inlets in State College Borough.

- DCNR administers Community Conservation Partnerships Program Grants. This program is funded with a variety of state and federal funding sources, including the Keystone Recreation, Park and Conservation Fund (Key 93) which encompasses several environmental and conservation related funds.
  - Several projects throughout Centre County were funded through this program from 2021-2024 for around $4.4 million. Each project includes a variety of interventions, including stormwater management measures, ADA access, open space conservation, environmental education, and construction of riparian buffers. Specifically, funds were awarded to Burnside Township, Centre Hall Borough, Patton Township, Snow Shoe Rails to Trails, Centre Region Parks & Recreation Authority, College Township, Ferguson Township, Penn State University, Nittany Valley Joint Recreation Authority, ClearWater Conservancy of Central PA.
- DCED manages the PA Small Water and Sewer Grant which funds small water, sewer, storm sewer, and flood control infrastructure projects. Funding is made available by the Commonwealth Financing Authority.
  - In 2020, several communities were awarded grant funds through this program. Boggs Township will replace damages and undersized stormwater pipes and inlets. Liberty Township will improve the existing sanitary system that flows into the Bald Eagle State Park wastewater treatment plan. Mountaintop Regional Sewer Authority will enhance water production capability during an extended power outage or other emergency event.

- Federal Government programs including:
  - Hazard Mitigation Assistance Programs, which provide grants for cost-effective mitigation projects either in the absence of a disaster or after a disaster declaration has occurred:
    - Flood Mitigation Assistance Program (FMA)
    - Hazard Mitigation Grant Program (HMGP)
    - The Building Resilient Infrastructure and Communities (BRIC) Program is a new funding program that will support states, local communities, tribes, and territories undertake hazard mitigation projects. BRIC replaced the Pre-Disaster Mitigation (PDM) program that was previously housed under HMA programs.

    The following is a sampling of projects for which FEMA has awarded Hazard Mitigation Assistance Grants in Centre County:
    - State College Borough: Park Forest Middle School post-flood repairs.
    - State College Borough: Alpha Fire Company additions.
    - Bellefonte Borough: Bellefonte Wastewater Treatment Plant repairs.
    - State College Borough: Addition of a catch dam in Walnut Spring Park.
    - Bellefonte Borough: Purdue Mountain Road post-flood repairs.
    - Addition of a detention pond on public property after severe floods.
    - Storm sewer and culvert repairs across Centre County after severe floods.
  - Community Development Block Grants (CDBG), which provides funds to address a wide range of community development needs, including community development activities directed toward revitalizing neighborhoods, economic development, and providing improved community facilities and services. CDBG funds may be used for activities such as acquisition of real property; relocation and demolition; rehabilitation of residential and non-residential structures; and construction of public facilities and improvements to facilities such as water, sewer, and streets. There is an extra CDBG fund set aside for post-disaster recovery costs. CBDG Mitigation Funds (CBDG-MIT) may also be used in areas impacted by disasters to mitigate future risks and reduce loses.

- Weatherization Assistance Program, which enables low-income households to make their homes more energy efficient.
- The Emergency Watershed Protection (EWP) Program is administered by the USDA Natural Resources Conservation Services to help communities quickly address serious and long-lasting damages to infrastructure and the environment. These funds are allocated soon after disasters to assist in with immediate recovery needs.
    - In October 2016, a heavy storm caused flash flooding in several parts of Centre County, resulting in damage to over 400 homes and businesses. A Federal Disaster Declaration for public assistance opened federal funding in December 2016. The USDA-NRCS confirmed three sites involving ten landowners were eligible for EWP program funding. The USDA-NRCS provided 75% of project funding and the PA DEP provided the required 25% funding match. All three recovery projects were completed by August 2017.
- The Homeland Security Grant Program (HSPG) assists communities in implementing the National Preparedness System by supporting the building, sustainment, and delivery of core capabilities essential to achieving the National Preparedness Goal of a secure and resilient Nation. The HSGP's allowable costs support efforts to build and sustain core capabilities across the prevention, protection, mitigation, response, and recovery, including priorities towards preventing terrorism and enhancing state and major urban area fusion centers.
- The Assistance to Firefighters Grant (AFG) administered by FEMA provides funds to help firefighters and other first responders obtain essential resources to protect the public and emergency responders in hazard events.
    - In August 2020, the Snow Shoe Volunteer Fire Company in Centre County was awarded an AFG to purchase new self-contained breathing apparatuses (SCBA). The company's existing SCBAs are nearly 15 years and have failed without warning in the past. This grant has been awarded several times in the past. For example, two fire companies were granted funds in 2005 to offer health and safety programs and enhance fire prevention measures.

5.2.4 Education and Outreach Capability

Education and outreach programs and methods are used to implement mitigation activities and communicate hazard-related information. Examples include fire safety

programs that fire departments deliver to students at local schools; participation in community programs, such as Firewise Communities Certification or StormReady Certification; and activities conducted as part of hazard awareness campaigns, such as Tornado or Flood Awareness Month. Some communities have their own public information or communications office to handle outreach initiatives.

Reported education and outreach activities in Centre County are summarized as follows:

- Centre County disseminates critical information through AlertCentre, a mass notification system. It allows Centre County EMA and 9-1-1 to send out alerts.
- Firewise Communities designation is an optional recognition program that empowers neighbors to take action to reduce wildfire risk. It is a five-step, voluntary process that helps communities develop an action plan that minimizes wildfire risk and helps build more safely. Currently, Centre Hall Borough and Miles Township have received Firewise Certification.
- StormReady Certification is an education and outreach program that helps arm communities with the communication and safety skills needed to save lives and property before, during, and after an event. The program is administered by the National Weather Service of the National Oceanic and Atmosphere Administration (NOAA). Centre County completed its enrollment in 2019; all communities are covered under the County Certification. Penn State University is also enrolled in the StormReady program.
- The Centre County Public Safety Training Center (CCPSTC) is a public safety training facility located in Spring Township. This facility is the result of a regional effort to provide training to police forces, firefighters, emergency services, and hazardous materials workers from across the state. The center includes training opportunities for fire responses with on-site apparatuses, a training tower, and a "burn building". Additionally, the center includes facilities for classroom-based trainings, as well as on-site driving and vehicle trainings. The center provides opportunities for trainees to confront a number of scenarios, including vehicle rescues, situations involving hazardous materials, high angle and confined space rescues, terrorism response, hostage simulation, vehicle operations, and vehicle extrication. While the center is open to any fire company or emergency medical service operation throughout the Commonwealth, the 12 counties expected to take greatest advantage from this center include Bedford, Blair, Cameron, Centre, Clearfield, Clinton, Fulton, Huntingdon, Juniata, Mifflin, Snyder and Union. More than 115 fire departments and nearly 73 emergency medical services organizations service those counties (CCPSTC, 2015).

- The Centre County Community Foundation offers emergency responder scholarships to local training programs. This opportunity increases access for local residents to become involved in emergency response plans and processes.
- Centre County organizes annual household hazardous waste collections events. These are used to educate residents about materials that should not go in waste streams and provides people a responsible place to drop off their materials. This mitigates the risk that households will dump hazardous materials in a way that leads to environmental contamination.
- Centre County has hosted three trainings and educational exercises for hazmat teams and other emergency response entities since 2021.
    - A propane response training was held in August 2023 with both county-contracted teams. The training was eight hours and teams were presented with propane specialist response kits. The training and kits were funded through a Hazardous Materials Emergency Preparedness (HMEP) grant.
    - An Urban Search and Rescue (USAR) exercise, funded by the SCMRTF in October 2023.
    - A TRANSCAER functional exercise was held in June 2024. Attendees participated in a simulated mass casualty incident involving a motor vehicle incident with a fuel tanker and propane delivery vehicle on SR-150. Participants were from a variety of county, municipal, and medical departments.
- Centre County Emergency Management Agency performed visits at the following fire companies in 2023-2024. The purpose of the visits was to familiarize the fire companies with the CCOES missions of, resources and to promote involvement with the South Central Mountains Region Task Forces.
    - September 12 – Howard Fire Company.
    - September 20 – Port Matilda Fire Company.
    - September 28 – Milesburg Fire Company.
    - October 3 – Mt. Top Fire Company.
    - October 5 – Centre Hall Fire Company.
    - October 10 – Snow Shoe Fire Company.
    - October 12 – Boalsburg Fire Company.
    - October 17 – Gregg Township Fire Company.
    - October 19 – Miles Township Fire Company.
    - October 24 – Logan Fire Company.
    - December 5 – Millheim Fire Company.
    - January 8 – Pine Glen Fire Company.

  - January 11 – Walker Township.
- Centre County Office of Emergency Services provides a variety of guides about hazard mitigation planning and preparedness, including:
  - The Flood Safety preparedness guide was developed in 2015. It describes essential steps to prepare for floods in existing homes and new construction and provides do's and don'ts of responding to flood events.
  - The "All Hazards" School Safety Planning Toolkit was developed by the Commonwealth in 2009. It provides an in-depth outline for planning and preparing for hazards in school facilities.
- The Centre County Heroin and Opioid Prevention and Education (HOPE) Initiative works to eliminate substance abuse, drug overdoses, and drug deaths in the County. This coalition was formally created in 2016, and includes partners from the prevention, treatment, and recovery community; agencies involved in the Criminal Justice System; and members of the community affected by addiction. The HOPE Initiative works to achieve its goals through comprehensive outreach and education programming, in addition to direct support for recovery and treatment options. This coalition regularly attends local events including town hall meetings, local fairs and expos, and events directly related to drug awareness (Centre County, 2020c).
- The Penn State University College of Engineering opened the Penn State Breazeale Reactor (PSBR) in 1955. PSBR staff assisted in the state response to the Three Mile Island (TMI-2) nuclear reactor accident. Immediately following the accident, PSBR staff answered questions about the accident and its affects. In the 1980s, the PSBR, staff developed special training and experiments for operators who would conduct the defueling procedure at the post-accident TMI-2 reactor. In 1990s, Penn State established the Radiation Science and Engineering Center, a university-wide facility to promote research, education, and varied applications of radiation science and nuclear engineering.
- The Centre County Office of Planning and Development adopted the Nittany and Bald Eagle Greenway Plan in 2003, which is an outreach plan to increase public awareness about Spring Creek and Bald Eagle Creek, and their tributaries. This plan calls for undeveloped land to be set aside for recreation or conservation (CCPCDO, 2003b).



Figure 5.2-4: TRANSCAER Exercise in June 2024



Figure 5.2-5: USAR Exercise in October 2023

5.2.5 Socially Vulnerable or Underserved Communities

To understand capabilities to provide assistance and support to socially vulnerable and underserved communities, meetings were held with organizations and a county office that work directly with some of these communities. This section provides an overview of their work and any capabilities that may be leveraged to mitigate the impacts of hazards discussed in this plan.

CentreHelps

CentreHelps is a State College-based organization that provides community assistance and support through a variety of programs, which include a drug and alcohol program, two hotlines, and basic needs assistance. The organization has a physical location that is open Monday through Friday, where it provides basic referral and information services. There are five full-time staff members and over 50 volunteers, most of which are Penn State students or alumni. State College Borough recently purchased and plans to renovate a former fraternity to provide the organization with a larger space, which will help expand operations and allow for trainings, community education events, and support group meetings.

The organization can provide basic financial assistance in times of crisis, including evictions or utility shut offs. They may provide money for bills or deposits for housing and vehicle repairs. Help can only be provided once per year but is designed to help families living paycheck to paycheck deal with an unexpected financial event. The Pennsylvania Commission on Crime and Delinquency (PCCD) provides some grant

funding for case management for individuals suffering from substance use disorder who may be unwilling to go to treatment due to financial barriers.

The Youthful Offender Program is a drug and alcohol program for mostly Penn State students who are referred to it by district magistrates. The program promotes empowerment and harm reduction by educating participants on the harms and consequences of drug and alcohol use. Referrals may be made to other, more specialized programs if an individual needs more help than the program can provide.

CentreHelps runs an information and referral hotline through a local number that is funded by the Centre County government. Individuals typically call this line for issues relating to housing, child services, financial distress, property disputes, or interpersonal relationships. The organization will provide both resource referrals and emotional support. They keep a database of over 600 local resources that is validated annually. The database is organized into 14 categories and 40 sub-categories. These include disaster relief, medical needs, legal resources, senior citizens, support groups, financial help, and education. They make referrals to the State College Food Bank, and in certain circumstances can provide bus or hotel vouchers to transport individuals to areas of support or provide bridge accommodation.

The 988 suicide prevention hotline is one of around a dozen in Pennsylvania. This system was recently updated so that Verizon and T-Mobile users now call the closest call center to the caller's location instead of the phone's area code. This has improved local services and has had a demonstrated impact on CentreHelp due to the large student population in State College. Calls increased from a few hundred to over 2,000 per year.

Out of the Cold

Out of the Cold runs a low-barrier shelter in State College that accepts all individuals over the age of 18. They run both a day and a night shelter. The organization was founded in 2011 and originally rotated between churches during the winter to provide shelter. During the COVID-19 pandemic, they purchased a permanent location. They have 12 total staff and over 200 volunteers, which are mostly students and local church goers.

The day shelter is open from 8:00am to 8:00pm and provides shower, laundry, food, and on-site case management services. They see over 200 different people throughout the year in the day shelter. The night shelter has around 20 guests each night. They have added an educational component, teaching individual living skills.

During the winter, the shelter is also a warming station. Out of the Cold works with State College Borough on their Cold Blue program, which requires the shelter to open its doors to anyone during extremely cold temperatures. This collaboration began in 2023.

The shelter has a website and newsletters, and many local organizations, such as CentreHelps, provide individual referrals.

Centre County Office of Veterans Affairs

The Office of Veterans Affairs works with veterans and their spouses to ensure they receive financial or other benefits from their service. This may include filing claims based on financial need or a service-connected disability and signing up for healthcare through the United States Department of Veterans Affairs. The office also works with the nonprofit Veterans Assistance Fund. Its website is embedded in the county website and some outreach is done to veterans.

The office may also mobilize in times of disaster to provide support. For example, in the event of significant flooding, the office may join other agencies and departments in discussing response and recovery. This may also include ensuring veterans are considered and are able to secure funding support.

5.2.6 Plan Integration

Plan integration ensures that hazard mitigation planning is woven into each municipality's planning and regulatory documents. These include the plans, policies, codes, and programs that guide land use and development. Effective integration of hazard mitigation occurs when the planning framework fosters development that does not increase risks from known hazards or leads to redevelopment that reduces risk from known hazards (FEMA, 2013). For information on how the last plan was integrated in to planning mechanism across the county, please refer to Section 6.1.3.

While not all regulatory tools are relevant to every municipality in Centre County, each municipality should evaluate what tools are available to them related to their vulnerability identified in this HMP. Communities should continue to review and revise building codes, zoning ordinances, floodplain ordinances, and subdivision and land use development ordinances with respect to findings in the 2025 HMP risk assessment. For example, a municipality could revise its zoning ordinance to restrict the density of new development in hazard-prone areas or guide development away from these areas. Some tools may also be useful for addressing multiple hazards in these municipalities; for example, the presence of a stormwater management plan would greatly enhance mitigation capabilities needed to address both flood and transportation hazards.

Comprehensive Plans

As mentioned above, Centre County adopted its Comprehensive Plan in 2003, and is finalizing Phase II, which involves updating existing chapters and creating new chapters of the plan. It is key that the county integrates findings and recommendations from the 2025 HMP Update into the implementation strategies and projects identified in chapters of the comprehensive plan. The planning elements in these documents relate to risks identified in this plan, for example drought, wildfire, and cyber-security. Phase I of the County Comprehensive Plan establishes a set of goals relating to future land use and relates these to recommendations for implementation. One of the County's key goals, as outlined in the Comprehensive Plan, is to preserve its natural resources for the benefit of present and future generations. Specifically, the County aims to balance demands for growth while protecting the County's natural resources, such as its forested land. As discussed previously, one of the key tools that can be harnessed for managing development identified in a Phase II Implementation Strategy is through zoning and land use regulations. Jurisdictions in Centre County have been successful in managing growth in forested lands through the use of special forest zoning. Such strategies could include utilizing hazard information in the 2025 HMP Update to inform future land use and discourage growth in high-hazard areas.

CCPCDO performs ongoing planning assistance for the local planning regions in Centre County. For example, CCPCDO has worked with the Nittany Valley and Upper Bald Eagle Regions to develop comprehensive plans. CCPCDO should integrate HMP information and materials throughout regional and municipal planning processes such as these. It is recommended that CCPCDO brings HMP information and materials to meetings to share with municipalities. Integrating the discussion of these planning efforts enables better implementation of hazard mitigation strategies. CCPCDO should track all municipal planning efforts in order to integrate hazard mitigation through a variety of plans and regulations. While regional comprehensive plans are developed and updated in the future, communities should consider including hazard mitigation as an element in land use control.

Transportation Plans

The Centre County Long Range Transportation Plan (LRTP) does not specifically address hazard mitigation planning; however, there are segments of the plan that relate to hazard mitigation, such as goals enhancing road safety and hazard reduction. The environmental analysis section of the LRTP discusses Centre County MPO's process for evaluating the potential impacts of on community and environmental resources. When impacts are unavoidable, CCMPO and project sponsors focus on minimizing and mitigating potential impacts of transportation projects, such as through coordination

with local resource agencies and educating candidate project sponsors about environmental mitigation strategies. There are several opportunities to integrate hazard mitigation principles and actions in the next update. Important additions can include an inventory of vulnerable transportation assets, a comprehensive group of evacuation routes, ways hazards may potentially impact the County's transportation system, and the integration of actions from the 2025 HMP Update.

Centre County's Recreation and Greenway Plan's goals are to preserve high-quality open space, establish and expand greenway and multi-modal trail systems, increase riparian buffers, and conserve the County's natural resources. The purpose of the plan is to establish specific priorities for conserving open spaces such as farms, forests, community parks, and water bodies and for creating future greenway corridors. Hazard-prone areas identified in the HMP could potentially be identified as suitable areas for conservation or greenways.

The CCMPO's Centre County Active Transportation Plan provides another opportunity. The goal of the plan is to provide safe transportation across the county and the planning process led to developing future projects that will improve conditions for bikes, pedestrians, and wheels. The plan draft may be reviewed and updated to further incorporate analysis or actions that promote mitigation. The MPO, CCPCDO, and OES may work together to identify ways to collaborate to achieve the goals of both plans.

Climate Action Plans (CAP)

Bellefonte released a CAP in 2020, which sets specific goals and actions to reduce greenhouse gas emissions. The plan was unadopted by the borough council in 2023 but may be re-adopted in the future. CRPA developed a regional Climate Action and Adaptation Plan (CAAP) in 2021. Any updates to these plans or additional plans that are developed in the county should consider the 2025 HMP when analyzing risks and developing mitigation strategies.

Ordinances and Codes

Hazard mitigation planning can be integrated into Centre County's Stormwater Management Regulations. The municipalities that are regulated by the County's stormwater management requirements in its SALDO could also opt to develop their own, more stringent stormwater management ordinances. Municipalities can provide recommendations for proper long-term operation and maintenance of stormwater management facilities within the land development subdivision ordinances, work closely with the County to assure that stormwater facilities are maintained over the long-term, and can ensure any hew hydrology studies are adopted upon completion.

Specific language in the Centre County SALDO that relates directly to hazard mitigation is documented below. Whether the County is administering the zoning ordinance for municipalities, or the municipality maintains administration, the following guidelines from Centre County's SALDO can be enforced through the lens of mitigating each municipality's hazards:

- Floodplains should be either maintained in their undeveloped state or be put to uses compatible with the floodplain environment.
- Development should not take place in areas where the soil presents severe engineering or environmental restrictions.
- Future growth patterns should be directed to ensure the protection of municipal and private water supplies. Surface and groundwater quality and flow and recharge must be maintained at levels which are environmentally acceptable.
- The Commission shall, when it deems it necessary for the health, safety, or welfare of the present and future population of the area and necessary for the conservation and protection of local water resources and environmental qualities, prohibit or restrict the Subdivision or Land Development of any portion or portions of the tract which lie within or directly adjacent to the floodplain of any stream or drainage source, unless adequate methods are formulated by the Applicant to solve the problems created by the floodplain environment.
- No Subdivision and/or Land Development, or part thereof, shall be approved if the proposed development and/or improvements will, individually or collectively, increase the regulatory flood elevation.
- The finished elevation of proposed streets shall be no more than two feet below the regulatory flood elevation. The Commission may require, where necessary, profiles and elevations of streets to determine compliance with this requirement.
- All sanitary sewer systems located in flood prone areas, whether public or private, shall be flood-proofed up to a point one foot above the regulatory flood elevation. The Commission may prohibit installation of sewage disposal facilities requiring soil absorption systems where such systems will not function due to high groundwater, flooding, or unsuitable soil characteristics.

Emergency Management

Centre County has a countywide EOP, which was updated in 2021, and all municipalities have a local EOP. Additionally, Penn State University has a Comprehensive Emergency Management Plan (CEMP). These plans embrace an "all-hazards" principle. Most emergency response functions are similar, regardless of the hazard, and the EMC is

required to mobilize functions and personnel as required by the emergency. This plan mentions that mitigation opportunities will be considered throughout disaster operations. Implementation includes a combination of conservation tools including land management plans and easements; regulatory methods like density transfers, zoning overlays, buffer zones, and subdivision exactions, and land acquisition made possible through donation and purchase, and purchase of development rights. As these plans are updated, they should incorporate relevant information from the Centre County HMP risk assessment to provide a more detailed overview of potential hazards. These plans should also incorporate long-term mitigation strategies, such as those outlined in this HMP Update, in addition to short-term response and recovery.

Integration Capabilities

Based on the capability assessment results and information from CCPCDO, all of Centre County's jurisdictions have some form of local land use controls. As is discussed in Section 6.1 – Mitigation Strategy Update Process Summary, Centre County upon review of the 2021 mitigation actions, it was determined that the County and several municipalities completed mitigation actions that achieve plan integration by furthering hazard mitigation goals through various land development regulations. Some other land use tools in municipalities have not been updated recently. As municipalities work to update comprehensive plans and land use ordinances, local governments can go further to use land use regulations to direct development away from hazard-prone areas. For example, the ridge zoning overlay that three communities already have in place can be adopted by other municipalities with mapped ridges.

A barrier to plan integration and expanding capabilities is often the lack of resources to accomplish activities that they require. Several municipalities noted on the Capability Assessment Surveys that lack of financial resources precludes development of some planning tools. The self-assessment portion of the survey provided each municipality an opportunity to conduct its own self-assessment of its capability to effectively implement hazard mitigation activities. As part of this process, County and municipal officials were encouraged to consider the barriers to implementing proposed mitigation strategies in addition to the mechanisms that could enhance or further such strategies. In response to the survey questionnaire, local officials classified each of the capabilities as either "limited," "moderate," or "high." Table 5.2-5 below summaries the results of the self-assessment survey as a percentage of responses received. With available resources being limited and stretched into the foreseeable future, plan integration is extremely relevant and will help leverage existing resources to the maximum extent possible.

Table 5.2-5: Self-Assessment Capability Responses Expressed as a Percentage of Responses Received

CAPABILITY CATEGORY	LIMITED	MODERATE	HIGH
Planning & Regulatory	33%	60%	7%
Administrative & Technical	40%	40%	20%
Financial	33%	67%	0%

6. MITIGATION STRATEGY

6.1 MITIGATION STRATEGY UPDATE PROCESS SUMMARY

The Mitigation Strategy serves as the long-term road map to reducing potential losses, vulnerabilities, and shortcomings identified in Section 4 – Risk Assessment. Typically, the Mitigation Strategy includes a list of goals and objectives, with mitigation actions that address those goals and objectives, that are then prioritized based on community needs.

- ✓ Goals are long-term aspirations about the resiliency of the community given the potential effects of hazards.
- ✓ Objectives are measurable strategies that the Centre County community has determined will be necessary to move closer to each goal.
- ✓ Actions are the tasks that are proposed for realizing each objective.

6.1.1 Mitigation Goal and Objective Review

There were five goals and 21 objectives identified in the 2021 HMP. These 2021 goals and objectives were reviewed by the HMSC and HMPT during the Mitigation Strategy and Capability Assessment Workshops held on October 15 and 16, 2024 and during a Steering Committee meeting held on October 17, 2024. The review of the 2021 goals and objectives is summarized below in Table 6.1-1. Goals and objectives from the 2021 Plan remain relevant and were largely carried over to the 2025 HMP. Objective 1F was updated to reflect the wording change from "transportation accidents" to "transportation incidents".

Table 6.2-1 in Section 6.2 2025 Mitigation Goals and Objectives lists the 2025 mitigation goals and objectives. This table shows that a new goal was added to address High Hazard Potential Dams. Objectives 1I and 3E from the 2021 plan were moved to be under this new goal. Also, two new objectives were added. One objective addressing socially vulnerable and underserved communities was added under Goal 1. One objective addressing climate change risk was added under Goal 4.

Table 6.1-1: Review of Changes to the 2021 HMP Goals and Objectives

GOAL/OBJECTIVE		COMMENTS
Goal 1	**Reduce potential injury or death and damage to existing community assets from all hazards.**	**Continued to 2025 HMP.**
Objective 1A	Identify and evaluate potential protection measures for critical facilities, structures, and population with the highest relative vulnerability to all hazards that affect Centre County.	Continued to 2025 HMP.
Objective 1B	Provide public outreach and education regarding property owners' vulnerability to all hazards affecting Centre County and strategies to mitigate the risks from these hazards.	Continued to 2025 HMP.
Objective 1C	Promote the use of applicable insurance programs (i.e., flooding, crop, and fire) in order to reduce impacts of hazards to property owners.	Continued to 2025 HMP.
Objective 1D	Ensure that existing drainage systems such as pipes, culverts, and channels are adequate and functioning properly.	Continued to 2025 HMP.
Objective 1E	Evaluate potential contamination of drinking water sources along transportation corridors.	Continued to 2025 HMP.
Objective 1F	Enhance planning efforts to account for areas of increased transportation accidents.	Updated "transportation accidents" to "transportation incidents"
Objective 1G	Reduce outage time during significant power failures.	Continued to 2025 HMP.
Objective 1H	Evaluate potential climate-related risks, and mitigate these risks while preparing communities for chronic and extreme weather events.	Continued to 2025 HMP.
Objective 1I	Coordinate with High-Hazard Potential Dam owners and affected officials on dam rehabilitation and funding.	Moved under new HHPD Goal.
Goal 2	**Ensure new construction and substantially improved construction is resistant to natural hazards.**	**Continued to 2025 HMP.**
Objective 2A	Assess the adequacy of municipal zoning/land-use ordinances and building-code implementation to reduce risk to identified hazards.	Continued to 2025 HMP.

Table 6.1-1: Review of Changes to the 2021 HMP Goals and Objectives

GOAL/OBJECTIVE		COMMENTS
Objective 2B	Encourage and facilitate the development or revision of comprehensive plans and zoning/land-use ordinances to limit development in high-hazard areas.	Continued to 2025 HMP.
Objective 2C	Provide adequate and consistent enforcement of ordinances and codes within and between jurisdictions.	Continued to 2025 HMP.
Goal 3	**Improve emergency warning and response procedures and capabilities.**	**Continued to 2025 HMP.**
Objective 3A	Increase public awareness through public outreach and education of actions to take during an emergency.	Continued to 2025 HMP.
Objective 3B	Enhance response capability of County and municipal fire, police, and emergency medical services personnel to all vulnerable populations.	Continued to 2025 HMP.
Objective 3C	Enhance response capability of County and municipal services by integrating vulnerability analyses into emergency planning efforts.	Continued to 2025 HMP.
Objective 3D	Evaluate communities that require warning systems and storm shelters.	Continued to 2025 HMP.
Objective 3E	Monitor and ensure Emergency Action Plans for all high hazard dams in the County are current.	Moved under new HHPD Goal.
Goal 4	**Promote hazard mitigation as a public value to be integrated in planning and policy efforts countywide in recognition of its importance to the health, safety, and welfare of the population.**	**Continued to 2025 HMP.**
Objective 4A	Provide public education to increase awareness of hazards and opportunities for mitigation.	Continued to 2025 HMP.
Objective 4B	Promote partnerships between various County departments and communities to continue to develop a countywide approach to identifying and implementing mitigation actions.	Continued to 2025 HMP.
Objective 4C	Seek opportunities to integrate hazard mitigation efforts with other planning initiatives throughout the County.	Continued to 2025 HMP.

Table 6.1-1: Review of Changes to the 2021 HMP Goals and Objectives

GOAL/OBJECTIVE		COMMENTS
Goal 5	**Protect existing natural resources, and promote the preservation of areas where the natural hazard threat potential is high.**	**Continued to 2025 HMP.**
Objective 5A	Work to preserve steeply sloping areas, sinkhole areas, floodplains, and other natural areas with high threat potential to reduce risk in surrounding populated areas.	Continued to 2025 HMP.
Objective 5B	Protect open space, including parks and wetlands, within the floodplain.	Continued to 2025 HMP.
Objective 5C	Restore degraded natural resources and open space to improve their flood, and other hazard, control function.	Continued to 2025 HMP.

6.1.2 Mitigation Action Review

There were 60 actions identified in the 2021 HMP. Mitigation actions identified and included in the 2021 Plan were distributed at the Mitigation Strategy and Capability Assessment Meeting held in October 2024. Each municipality, the County, and Penn State University were provided with a Mitigation Action Progress Form where communities and stakeholders were asked to indicate the status of each action.

Based on these forms, each 2021 mitigation action has been assigned one of the following categories:

- "Completed" – Actions that were completed since the adopted of the 2021 Plan.
- "Cancelled" – Actions that were terminated.
- "Deferred" – Actions that had not been initiated since the adoption of the 2021Plan.
- "On-Going" – Actions that are performed on a regular and continual basis by the department.

The majority of existing mitigation actions have been carried over into this 2025 HMP as many actions are continuous or have not yet been completed. A list of the 2015 actions and their status is included in Table 6.1-2. The status of each action was evaluated with the intent of creating a usable mitigation action plan for 2021 with actions and projects that could be completed over the next five years. Appendix C includes responses provided by stakeholders on the Mitigation Action Progress Forms.

Table 6.1-2: Five-Year Mitigation Plan Action Review

#	2021 HMP ACTION	MUNICIPALITY	STATUS			
			COMPLETED	CANCELLED	DEFERRED	ONGOING
1	Conduct fire prevention inspections, especially in historic properties, annually.	Bellefonte Borough				X
2	Identify and execute the most cost effective floodproofing that will protect Phoenix Avenue business, residential, and critical facility (Bellefonte Emergency Medical Services) properties.	Bellefonte Borough				X
3	Increase current diking level surrounding the wastewater treatment plant.	Bellefonte Borough				X
4	Complete construction of flood wall to protect properties along Spring Creek between High Street and Lamb Street.	Bellefonte Borough	X			
5	Continue study of stormwater runoff impacts in flood-prone area of E Street.	Bellefonte Borough				X
6	Obtain grant funding for fire suppression systems and equipment for large, economic anchor, buildings.	Bellefonte Borough				X
7	Identify and execute the most cost effective floodproofing projects, including buying properties in the floodplain and other structural or infrastructural improvements, that will effectively protect floodplain properties in the Borough of Milesburg.	Milesburg Borough				X
8	Move vulnerable section of Borough's main waterline near State Route 445 and Elk Creek.	Millheim Borough	X			

Table 6.1-2: Five-Year Mitigation Plan Action Review

#	2021 HMP ACTION	MUNICIPALITY	STATUS			
			COMPLETED	CANCELLED	DEFERRED	ONGOING
9	Continue to restrict future development at sites within the floodplain in Ferguson Township.	Ferguson Township				X
10	Identify and execute the most cost-effective floodwater mitigation project to protect property and access into flood-prone community of the Village of Spring Mills.	Gregg Township				X
11	Provide public education and resources for identifying and reporting sinkholes and subsidence areas.	Haines Township				X
12	Identify and execute the most cost-effective floodwater mitigation project to protect property and access into flood-prone community of the Village of Coburn.	Penn Township				X
13	Complete development and implementation of source water protection plan to prevent unfiltered chemicals from entering Tussey sinkhole and ground water supply along US Route 322.	Potter Township				X

Table 6.1-2: Five-Year Mitigation Plan Action Review

#	2021 HMP ACTION	MUNICIPALITY	STATUS			
			COMPLETED	CANCELLED	DEFERRED	ONGOING
14	Continue to provide homeowners and developers advice on Karst topography when developing in known sinkhole prone areas.	Centre County, Bellefonte Borough, Benner Township, Burnside Township, Centre Hall Borough, College Township, Curtin Township, Ferguson Township, Gregg Township, Haines Township, Halfmoon Township, Harris Township, Howard Borough, Howard Township, Huston Township, Liberty Township, Marion Township, Milesburg Borough, Millheim Borough, Patton Township, Penn Township, Port Matilda Borough, Potter Township, Rush Township, Snow Shoe Township, Spring Township, State College Borough, Taylor Township, Union Township, Unionville Borough, Walker Township, Worth Towship				X
15	Participate in the development and continued update of Emergency Action Plans.	Centre County, Benner Township, College Township, Penn Township, Liberty Township, Rush Township				X
16	Provide fire safety education program.	Bellefonte Borough, College Township, Ferguson Township, Halfmoon Township, Harris Township, Patton Township, State College Borough				X

Table 6.1-2: Five-Year Mitigation Plan Action Review

#	2021 HMP ACTION	MUNICIPALITY	STATUS			
			COMPLETED	CANCELLED	DEFERRED	ONGOING
17	Acquire additional generators for shelter locations.	College Township				X
18	Continue to coordinate with PA State Game Commission and DCNR to conduct prescribed burns as necessary to reduce wildfire risk.	College Township, Ferguson Township, Halfmoon Township, Harris Township, Patton Township, State College Borough				X
19	Continue to identify point of dispensing sites.	College Township, Ferguson Township, Halfmoon Township, Harris Township, Patton Township, State College Borough				X
20	Provide information to private land owners about benefits of and obtaining crop insurance for drought protection.	College Township, Ferguson Township, Gregg Township, Halfmoon Township, Harris Township, Liberty Township, Marion Township, Potter Township, Spring Township, Walker Township				X
21	Expand participation in the Firewise Program.	College Township, Ferguson Township, Gregg Township, Halfmoon Township, Harris Township, Patton Township, Rush Township, Snow Shoe Township, State College Borough, Walker Township				X

Table 6.1-2: Five-Year Mitigation Plan Action Review

#	2021 HMP ACTION	MUNICIPALITY	STATUS			
			COMPLETED	CANCELLED	DEFERRED	ONGOING
22	Continue participation in Centre County Task Force to coordinate issues on deep gas drilling, economics, and water quality.	Boggs Township, Burnside Township, Curtin Township, Howard Borough, Howard Township, Huston Township, Liberty Township, Philipsburg Borough, Port Matilda Borough, Rush Township, Snow Shoe Borough, Snow Shoe Township, Taylor Township, Union Township, Unionville Borough, Worth Township		X		
23	Increase awareness of and participation in FEMA's Community Rating System (CRS) Program.	Centre County			X	
24	Coordinate the performance of detailed flood studies for the County's high-hazard areas to determine a full range of flood-recurrence intervals for use in future vulnerability analyses.	Centre County				X
25	Obtain from PEMA Bureau of Recovery and Mitigation listings of repetitive loss properties within Centre County and distribute to municipal elected officials and managers.	Centre County				X
26	Secure state or grant funding to update and adopt Act 167 Stormwater Management Plan.	Centre County			X	

Table 6.1-2: Five-Year Mitigation Plan Action Review

#	2021 HMP ACTION	MUNICIPALITY	STATUS			
			COMPLETED	CANCELLED	DEFERRED	ONGOING
27	Coordinate construction projects and winter storm response plans.	Centre County				X
28	Maintain StormReady County status.	Centre County				X
29	Continue participation in and encourage continued participation by municipality first responders in South Central Mountains Regional Task Force.	Centre County				X
30	Coordinate with state and federal agencies on potential mitigation actions for terrorist activities.	Centre County				X
31	Assist with coordination between County residents and utility companies on critical outage events.	Centre County				X
32	Enhance the participation on the County Hazard Mitigation Steering Committee	Centre County				X
33	Integrate hazard mitigation goals and objectives into County Phase II comprehensive planning efforts by developing a Hazard Mitigation Implementation Strategy chapter.	Centre County			X	
34	Identify water suppliers that are at greater risk to effects from drought and determine if they are candidates for interconnections from area suppliers.	Centre County				X
35	Provide alternate power sources for each new or remodeled building on University Park Campus which provides essential functions.	Penn State University	X			

Table 6.1-2: Five-Year Mitigation Plan Action Review

#	2021 HMP ACTION	MUNICIPALITY	STATUS			
			COMPLETED	CANCELLED	DEFERRED	ONGOING
36	Continue development and updates of Game Action Plans, to detail response to address post-game disturbances at Penn State.	Penn State University, College Township, Ferguson Township, Halfmoon Township, Harris Township, Patton Township, State College Borough				X
37	Obtain and compile updated Department of Environmental Protection inundation data and Emergency Action Plan vulnerability data as it becomes available to inform plan update.	Centre County				X

Table 6.1-2: Five-Year Mitigation Plan Action Review

#	2021 HMP ACTION	MUNICIPALITY	STATUS			
			COMPLETED	CANCELLED	DEFERRED	ONGOING
38	Obtain grant funding to acquire, demolish, relocate, and/or elevate structures that are vulnerable to flooding.	Centre County, Bellefonte Borough, Benner Towsnhip, Boggs Township, Burnside Township, College Township, Curtin Township, Ferguson Township, Gregg Township, Haines Township, Halfmoon Township, Harris Township, Howard Borough, Howard Township, Huston Township, Liberty Township, Marion Township, Milesburg Borough, Millheim Borough, Patton Township, Penn Township, Philipsburg Borough, Port Matilda Borough, Potter Township, Rush Township, Snow Shoe Borough, Snow Shoe Township, Spring Township, State College Borough, Taylor Township, Union Township, Unionville Borough, Walker Township, and Worth Township				X

Table 6.1-2: Five-Year Mitigation Plan Action Review

#	2021 HMP ACTION	MUNICIPALITY	STATUS			
			COMPLETED	CANCELLED	DEFERRED	ONGOING
39	Review floodplain ordinances annually to ensure compliance with current floodplain management and insurance standards and guidance.	Bellefonte Borough, Benner Township, Boggs Township, Burnside Township, College Township, Curtin Township, Ferguson Township, Gregg Township, Haines Township, Halfmoon Township, Harris Township, Howard Borough, Howard Township, Huston Township, Liberty Township, Marion Township, Milesburg Borough, Millheim Borough, Patton Township, Penn Township, Philipsburg Borough, Port Matilda Borough, Potter Township, Rush Township, Snow Shoe Township, Spring Township, State College Borough, Taylor Township, Union Township, Unionville Borough, Walker Township, Worth Township				X
40	Develop a Centre Region Taskforce to complete a detailed After Action Report and Improvement Plan (IP) for COVID-19. The taskforce will meet regularly to ensure implementation of the IP and plan for other infectious disease issues in the Centre Region.	College Township, Ferguson Township, Halfmoon Township, Harris Township, Patton Township, State College Borough				X

Table 6.1-2: Five-Year Mitigation Plan Action Review

#	2021 HMP ACTION	MUNICIPALITY	STATUS			
			COMPLETED	CANCELLED	DEFERRED	ONGOING
41	Expand wildfire training to first responders, increase outreach to local officials to explain risks, and use the fire department to include wildfire awareness in their school educational program.	Haines Township				X
42	Replace water holding tanks that do not meet current PA DEP standards.	Penn Township				X
43	Develop response plans for potential civil disturbances.	State College Borough				X
44	Clean up after flooding	Milesburg Borough				X
45	Provide cyber-security and awareness training to all County staff to reduce risk and occurrence of phishing and malware attacks.	Centre County				X
46	Maintain and update threat protection program software.	Centre County				X
47	Work with Pennsylvania Department of Health to increase awareness about treating and preventing opioid addiction.	Centre County				X
48	Equip municipalities, small business, and other organizations as applicable with Personal Protective Equipment (PPE) to proactively mitigate future spread of COVID-19.	Centre County	X			

Table 6.1-2: Five-Year Mitigation Plan Action Review

#	2021 HMP ACTION	MUNICIPALITY	STATUS			
			COMPLETED	CANCELLED	DEFERRED	ONGOING
49	Coordinate with the Pennsylvania Department of Health to establish COVID-19 testing and vaccination sites, once a vaccine has been developed.	Centre County	X			
50	Work with the Pennsylvania Department of Health to make the public aware of the availability of a Covid-19 vaccine, once a vaccine has been developed.	Centre County	X			
51	Maintain a GIS layer of the location of all permitted dams within the County, categorized by priority concern. Utilize dam location layer, inundation data, building footprints, and tax parcel information to develop potential evacuation measures in the event of a breach or failure.	Centre County				X
52	Provide notice of funding opportunity and supporting documentation from the County HMP to EMCs and the municipality with High Hazard Potential Dams to promote rehabilitation and safety in Centre County.	Centre County				X
53	Encourage land use planning and zoning controls to minimize population growth near hazardous materials sites.	Centre County			X	

Table 6.1-2: Five-Year Mitigation Plan Action Review

#	2021 HMP ACTION	MUNICIPALITY	STATUS			
			COMPLETED	CANCELLED	DEFERRED	ONGOING
54	Improve coordination with local municipalities to reduce risk from hazardous material incidents and conduct trainings to prepare for hazardous materials incidents.	Centre County				X
55	Ensure that emergency responders are training in response to incidents involving gasoline and other flammable liquid products.	Centre County				X
56	Integrate hazard mitigation goals and objectives into updated regional and local comprehensive plans, where applicable.	Centre County	X			
57	Provide temporary high-speed internet hot spots during an emergency in the event that broadband availability is impacted.	Centre County				X
58	Use existing road-stream crossing data to identify bridges and culverts that are most vulnerable to ice jams.	Centre County			X	
59	Work with vendors of services to secure high-speed internet connection and enhance reliability throughout much of the valley where connectivity is poor.	Miles Township				X
60	Replace existing fire equipment for the Miles Township Fire Company with new equipment that meets applicable standards.	Miles Township				X

6.1.3 Mitigation Successes

A wide variety of progress has been made on hazard mitigation projects and actions within the last five years. Details on actions marked as "completed" or "ongoing" are summarized below:

Flood Mitigation Successes

- Bellefonte Borough completed construction of a flood wall to protect properties along Spring Creek between High Street and Lamb Street.
- Millheim Borough moved a vulnerable section of the main waterline near State Route 445 and Elk Creek.

Pandemic Successes

- Centre County Office of Emergency Services equipped municipalities, small businesses and other organizations with PPE to proactively mitigate the spread of COVID-19.
- Centre County Office of Emergency Services coordinated with the Pennsylvania Department of Health to establish COVID-19 testing and vaccination sites. They also worked to make the public aware of the availability of the COVID-19 vaccine.

Utility Interruption Successes

- Penn State University provided an alternate power source for each new or remodeled building on the University Park Campus.

Wildfire and Urban Fire Mitigation Successes

- The Centre Region Council of Governments provides a Fire Safety Program to Patton Township, Harris Township, College Township, Ferguson Township, State College Borough, and Bellefonte Borough. Services provided through this program that relate to the mitigation of fire hazards include: inspection of all commercial properties to ensure compliance with the International Fire Code; review of building plans and inspections of fire protection systems being installed in existing building; public education regarding fire safety to schools, fraternities, and civic groups; and assistance to the Centre Region Fire Marshall in the investigation of fires to determine if code violations contributed to the fire, or if code improvements helped minimize the severity of the fire.
- Centre County continues to coordinate prescribed burns with the PA Game Commission and the PA Department of Conservation and Natural Resources (DCNR). Controlled or prescribed burning is a forest management technique that helps to reduce fuel buildup and decreases the likelihood of more serious, hotter fires in the future. Prescribed burning can also help to control invasive plant

specifies and reduce deer tick populations. Weather conditions and COVID complications have kept the DCNR from performing any prescribed burns since the 2015 HMP. However, there are plans to implement this action in the future when conditions permit it to occur safely.

Subsidence and Sinkhole Mitigation Successes

- Centre County has continued to provide homeowners and developers with advice on Karst topography when developing in known sinkhole prone areas. The County has incorporated this into the Comprehensive Plan and its Subdivision and Land Development Ordinance (SALDO) review process. This is also an ongoing effort in municipalities with Karst topography throughout the county. For example, Centre Hall recommends that homeowners consult an engineer before building in sinkhole prone areas, while Patton Township, Potter Township, and State College Borough provide information to landowners through their planning offices.

Planning and Regulatory Successes

- The Centre Planning Region created a climate action and adaptation plan that was enacted in 2021. This plan provides guidance on how the Centre Region communities can work to address the challenges of climate change. The municipalities in the region have been recognized with the Sustainable Pennsylvania Community Certification for their efforts and commitments.

- Ferguson Township hosted a community resilience building workshop on Wednesday, April 28, 2021 to identify sustainability and resilience goals in the Township. More information on this workshop can be found here: https://www.twp.ferguson.pa.us/home/news/findings-community-resilience-building-workshop.

Structure and Infrastructure Successes

- The University Area Joint Authority in College Township that supplies wastewater treatment to a majority of properties in the Centre Region installed 5MW of solar with a battery – the first microgrid in the West Penn Power utility service territory. More information on this project can be found here: https://www.rettew.com/phase-ii-of-uaja-solar-array-formally-completed/.

Emergency Response Successes

- Centre County and Penn State University have maintained their StormReady statuses since 2021. Program requirements include establishments of a 24-hour warning point and emergency operations center, multiple ways to receive severe weather warnings and public alerts, create a system to monitor local weather

conditions, promote the importance of public readiness through community seminars, and develop a formal hazardous weather plan that includes training severe weather spotters and holding emergency exercises. Centre County offers annual presentations on the StormReady Program through emergency management coordinator trainings.

Community Development Block Grant (CDBG) Funded Projects

- Centre County has successfully secured CDBG funding for multiple projects. Projects that are being executed are outlined in the table below.

Table 6.1-3: CDBG Funded Projects 2021 through 2023

YEAR	PROJECT NAME	FUNDED AMOUNT	STATUS
2021	Penn Township Water Storage Tank Rehabilitation.	$117,000	Open
2021	Eagle Creek Water and Sewer Project	$52,392	Open
2021	SEDA-COG Admin - Centre	$62,000	Open
2021	OBO Bellefonte Streetscape Safety Improvements	$96,977	Open
2021	SEDA-COG Admin - Bellefonte	$20,000	Open
2021	Haines-Aaronsburg Water Well Rehab, Phase II	$128,500	Open
2022	Eagle Creek Water and Sewer Project	$54,916	Open
2022	Gregg Township Community Center Restoration	$230,050	Open
2022	SEDA-COG Admin - Centre	$62,000	Open
2022	Talleyrand Park Suspension Bridge RAB	$97,952	Open
2022	SEDA-COG Admin - Bellefonte	$20,000	Open
2023	Mountain Avenue Waterline Replacement	$215,700	Open
2023	Gregg Township Community Center Restoration	$69,471	Open
2023	SEDA-COG Admin - Centre	$62,000	Open
2023	OBO Bellefonte Borough Talleyrand Park Suspension Bridge RAP	$$97,993	Open
2023	SEDA-COG Admin - Bellefonte	$20,000	Open

6.2 2021 MITIGATION GOALS AND OBJECTIVES

Based on the review of the 2021 HMP goals and objectives, a new set of goals and objectives were developed in 2025. Table 6.2-1 below lists the updated mitigation goals and objectives established for the 2025 Plan Update. Table 6.1-1 identifies the changes made to the goals and objectives. There are 6 goals and 25 objectives.

Table 6.2-1: 2025 Goals and Objectives

Goal 1	Reduce potential injury or death and damage to existing community assets from all hazards.
Objective 1A	Identify and evaluate potential protection measures for critical facilities, structures, and population with the highest relative vulnerability to all hazards that affect Centre County.
Objective 1B	Provide public outreach and education regarding property owners' vulnerability to all hazards affecting Centre County and strategies to mitigate the risks from these hazards.
Objective 1C	Promote the use of applicable insurance programs (i.e., flooding, crop, and fire) in order to reduce impacts of hazards to property owners.
Objective 1D	Ensure that existing drainage systems such as pipes, culverts, and channels are adequate and functioning properly.
Objective 1E	Evaluate potential contamination of drinking water sources along transportation corridors.
Objective 1F	Enhance planning efforts to account for areas of increased transportation incidents.
Objective 1G	Reduce outage time during significant power failures.
Objective 1H	Evaluate potential climate-related risks, and mitigate these risks while preparing communities for chronic and extreme weather events.
Objective 1I	Reduce the risk of natural hazards for socially vulnerable populations and underserved communities.
Goal 2	Ensure new construction and substantially improved construction is resistant to natural hazards.
Objective 2A	Assess the adequacy of municipal zoning/land-use ordinances and building-code implementation to reduce risk to identified hazards.
Objective 2B	Encourage and facilitate the development or revision of comprehensive plans and zoning/land-use ordinances to limit development in high-hazard areas.
Objective 2C	Provide adequate and consistent enforcement of ordinances and codes within and between jurisdictions.
Goal 3	Improve emergency warning and response procedures and capabilities.

Objective 3A	Increase public awareness through public outreach and education of actions to take during an emergency.
Objective 3B	Enhance response capability of County and municipal fire, police, and emergency medical services personnel to all vulnerable populations.
Objective 3C	Enhance response capability of County and municipal services by integrating vulnerability analyses into emergency planning efforts.
Objective 3D	Evaluate communities that require warning systems and storm shelters.
Goal 4	Promote hazard mitigation as a public value to be integrated in planning and policy efforts countywide in recognition of its importance to the health, safety, and welfare of the population.
Objective 4A	Provide public education to increase awareness of hazards and opportunities for mitigation.
Objective 4B	Promote partnerships between various County departments and communities to continue to develop a countywide approach to identifying and implementing mitigation actions.
Objective 4C	Seek opportunities to integrate hazard mitigation efforts with other planning initiatives throughout the County.
Objective 4D	Develop and maintain an understanding of increased risk from climate change impacts to natural hazards.
Goal 5	Protect existing natural resources, and promote the preservation of areas where the natural hazard threat potential is high.
Objective 5A	Work to preserve steeply sloping areas, sinkhole areas, floodplains, and other natural areas with high threat potential to reduce risk in surrounding populated areas.
Objective 5B	Protect open space, including parks and wetlands, within the floodplain.
Objective 5C	Restore degraded natural resources and open space to improve their flood, and other hazard, control function.
Goal 6	Protect people and assets from the potential impacts of High Hazard Potential Dams.
Objective 6A	Monitor and ensure Emergency Action Plans for all high hazard dams in the County are current.
Objective 6B	Coordinate with High-Hazard Potential Dam owners and affected officials on dam rehabilitation and funding.

6.3 IDENTIFICATION AND ANALYSIS OF MITIGATION TECHNIQUES

The Mitigation Strategy in the updated HMP should include analysis of a comprehensive range of specific techniques or actions. FEMA, through the March 2023 Local Mitigation Handbook, and PEMA, through the 2020 Standard Operating Guide, identify four categories of hazard mitigation techniques.

Local plans and regulations: Government authorities, policies, or codes that influence the way land and buildings are developed and built. Examples include, but are not limited to, comprehensive plans, subdivision regulations, building codes and enforcement, and the NFIP and CRS.

Structure and infrastructure: Modifying existing structures and infrastructure or constructing new structures to reduce hazard vulnerability. Examples include, but are not limited to, acquisition and elevation of structures in flood prone areas, utility undergrounding, structural retrofits, floodwalls and retaining walls, detention and retention structures, and culverts.

Natural systems protection: Actions that minimize damage and losses and preserve or restore the functions of natural systems. Examples include, but are not limited to, sediment and erosion control, stream corridor restoration, forest management, conservation easements, and wetland restoration and preservation.

Education and awareness: Actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate the hazards and may also include participation in national programs. Examples include, but are not limited to, radio or television spots, websites with maps and information, provide information and training, NFIP outreach, StormReady, and Firewise Communities.

Table 6.3-1 provides a matrix identifying the mitigation techniques used for the hazards identified in the Risk Assessment. The specific actions associated with these techniques are included in Table 6.4-1 in the next section.

Table 6.3-1: Mitigation Techniques for All Hazards in Centre County

HAZARD (in order of Risk Factor ranking)	MITIGATION TECHNIQUE			
	PLANS AND REGULATIONS	STRUCTURE AND INFRASTRUCTURE	NATURAL SYSTEMS PROTECTION	EDUCATION AND AWARENESS
Flood, Flash Flood, Ice Jam (N)	X	X	X	X
Pandemic and Infectious Disease (N)	X	X		X
Transportation Incidents (M)	X	X		X
Winter Storm (N)	X	X		X
Substance Use Disorder	X			X
EH – Hazardous Materials Release (M)	X	X	X	X
Drought (N)	X	X		X
Utility Interruption (M)	X	X		X
EH - Conventional Oil and Gas Wells (M)	X			X
EH - Unconventional Oil and Gas (M)	X			X
Tornado, Windstorm (N)	X	X		X

Table 6.3-1: Mitigation Techniques for All Hazards in Centre County

HAZARD (in order of Risk Factor ranking)	MITIGATION TECHNIQUE			
	PLANS AND REGULATIONS	STRUCTURE AND INFRASTRUCTURE	NATURAL SYSTEMS PROTECTION	EDUCATION AND AWARENESS
Extreme Temperature (N)	X			X
Hurricane, Tropical Storm, Nor'easter (N)	X	X	X	X
Terrorism (M)	X			X
Subsidence, Sinkhole (N)	X			X
EH – Coal Mining (M)	X		X	X
EH – Gas and Liquid Pipelines (M)	X			X
Cyber Terrorism (M)	X	X		X
Dam Failure (M)	X			X
Wildfire (N)	X	X	X	X
Nuclear Incidents (M)	X			X
Civil Disturbance (M)	X			X
Landslide (N)	X			X
Earthquake (N)	X	X		X
Radon Exposure (N)	X			X
Urban Fire and Explosion (M)	X	X		X
Lightning Strike (N)	X			X

Table 6.3-2 provides a matrix identifying which municipalities have mitigation actions for each of hazards identified in the Risk Assessment. Each municipality has one action for all high risk hazards, and for all medium and low risk hazards that they have identified as impacting them. This is identified in table 4.4-3. Table 4.4-3 shows the different municipalities in Centre County and whether their risk is greater than (>), less than (<), or equal to (=) the risk factor assigned to the County as a whole. Each municipality has a mitigation action for any hazards identified as greater than or equal to the risk factor of the County. The specific actions associated with these techniques are included in Table 6.4-1 in the next section.

Table 6.3-2: Mitigation Actions Per Hazard for Each Municipality

MUNICIPALITY	Flood, Flash Flood, Ice Jam (N)	Pandemic and Infectious Disease (N)	Transportation Incidents (M)	Winter Storm (N)	Substance Use Disorder (M)	EH - Hazardous Materials Release (M)	Drought (N)	Utility Interruption (M)	Tornado, Windstorm (N)	Extreme Temperature (N)	Hurricane, Tropical Storm, Nor' easter (N)	Terrorism (M)	Subsidence, Sinkhole (N)	EH - Conventional Oil and Gas Wells (M)	EH - Unconventional Oil and Gas (M)	EH - Coal Mining (M)	EH - Gas and Liquid Pipelines (M)	Cyber Terrorism (M)	Dam Failure (M)	Wildfire (N)	Nuclear Incidents (M)	Civil Disturbance (M)	Landslide (N)	Earthquake (N)	Radon Exposure (N)	Urban Fire and Explosion (M)	Lightning Strike (N)
Bellefonte Borough	X	X	X	X	X	X	X	X	X	X	X	X	X				X	X			X	X	X	X	X	X	X
Benner Township	X	X	X	X	X	X	X	X	X	X	X	X	X					X	X	X		X	X	X	X	X	X
Boggs Township	X	X	X	X	X	X	X	X	X	X	X	X		X			X	X		X		X	X	X	X	X	X

Table 6.3-2: Mitigation Actions Per Hazard for Each Municipality

MUNICIPALITY	Flood, Flash Flood, Ice Jam (N)	Pandemic and Infectious Disease (N)	Transportation Incidents (M)	Winter Storm (N)	Substance Use Disorder (M)	EH - Hazardous Materials Release (M)	Drought (N)	Utility Interruption (M)	Tornado, Windstorm (N)	Extreme Temperature (N)	Hurricane, Tropical Storm, Nor' easter (N)	Terrorism (M)	Subsidence, Sinkhole (N)	EH - Conventional Oil and Gas Wells (M)	EH - Unconventional Oil and Gas (M)	EH - Coal Mining (M)	EH - Gas and Liquid Pipelines (M)	Cyber Terrorism (M)	Dam Failure (M)	Wildfire (N)	Nuclear Incidents (M)	Civil Disturbance (M)	Landslide (N)	Earthquake (N)	Radon Exposure (N)	Urban Fire and Explosion (M)	Lightning Strike (N)
Burnside Township	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X
Centre Hall Borough		X	X	X	X	X	X	X	X	X	X		X					X				X		X	X	X	X
College Township	X	X	X	X	X	X	X	X	X	X	X	X	X					X	X	X	X	X	X	X	X	X	X
Curtin Township	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X
Ferguson Township	X	X	X	X	X	X	X	X	X	X	X	X	X					X	X	X		X	X	X	X	X	X
Gregg Township	X	X	X	X	X	X	X	X	X	X	X	X	X						X	X				X	X	X	X
Haines Township	X	X	X	X	X	X	X	X	X	X	X		X					X	X	X			X	X	X		X

Table 6.3-2: Mitigation Actions Per Hazard for Each Municipality

MUNICIPALITY	Flood, Flash Flood, Ice Jam (N)	Pandemic and Infectious Disease (N)	Transportation Incidents (M)	Winter Storm (N)	Substance Use Disorder (M)	EH - Hazardous Materials Release (M)	Drought (N)	Utility Interruption (M)	Tornado, Windstorm (N)	Extreme Temperature (N)	Hurricane, Tropical Storm, Nor' easter (N)	Terrorism (M)	Subsidence, Sinkhole (N)	EH - Conventional Oil and Gas Wells (M)	EH - Unconventional Oil and Gas (M)	EH - Coal Mining (M)	EH - Gas and Liquid Pipelines (M)	Cyber Terrorism (M)	Dam Failure (M)	Wildfire (N)	Nuclear Incidents (M)	Civil Disturbance (M)	Landslide (N)	Earthquake (N)	Radon Exposure (N)	Urban Fire and Explosion (M)	Lightning Strike (N)
Halfmoon Township	X	X	X	X	X	X	X	X	X	X	X		X					X		X		X	X	X	X	X	X
Harris Township	X	X	X	X	X	X	X	X	X	X	X	X	X				X	X	X	X		X			X	X	X
Howard Borough	X	X	X	X	X	X	X	X	X	X	X		X					X						X	X		X
Howard Township	X	X	X	X	X	X	X	X	X	X	X		X							X				X	X		X
Huston Township	X	X	X	X	X	X	X	X	X	X	X		X	X						X			X	X	X		X
Liberty Township	X	X	X	X	X	X	X	X	X	X	X	X	X	X				X	X	X		X	X	X	X	X	X
Marion Township	X	X	X	X	X	X	X	X	X	X	X	X	X	X				X		X		X	X	X	X	X	X

Table 6.3-2: Mitigation Actions Per Hazard for Each Municipality

MUNICIPALITY	Flood, Flash Flood, Ice Jam (N)	Pandemic and Infectious Disease (N)	Transportation Incidents (M)	Winter Storm (N)	Substance Use Disorder (M)	EH - Hazardous Materials Release (M)	Drought (N)	Utility Interruption (M)	Tornado, Windstorm (N)	Extreme Temperature (N)	Hurricane, Tropical Storm, Nor' easter (N)	Terrorism (M)	Subsidence, Sinkhole (N)	EH - Conventional Oil and Gas Wells (M)	EH - Unconventional Oil and Gas (M)	EH - Coal Mining (M)	EH - Gas and Liquid Pipelines (M)	Cyber Terrorism (M)	Dam Failure (M)	Wildfire (N)	Nuclear Incidents (M)	Civil Disturbance (M)	Landslide (N)	Earthquake (N)	Radon Exposure (N)	Urban Fire and Explosion (M)	Lightning Strike (N)
Miles Township	X	X	X	X	X	X	X	X	X	X	X	X	X					X	X	X		X	X	X	X	X	X
Milesburg Borough	X	X	X	X	X	X	X	X	X	X	X	X	X					X				X	X	X	X	X	X
Millheim Borough	X	X	X	X	X	X	X	X	X	X	X	X	X					X	X	X		X	X	X	X	X	X
Patton Township	X	X	X	X	X	X	X	X	X	X	X	X	X					X	X	X		X	X	X	X	X	X
Penn Township	X	X	X	X	X	X	X	X	X	X	X	X	X					X	X	X		X	X	X	X	X	X
Philipsburg Borough	X	X	X	X	X	X	X	X	X	X	X	X		X	X			X	X	X		X			X	X	X
Port Matilda Borough	X	X	X	X	X	X	X	X	X	X	X	X	X					X				X		X	X	X	X

Table 6.3-2: Mitigation Actions Per Hazard for Each Municipality

MUNICIPALITY	Flood, Flash Flood, Ice Jam (N)	Pandemic and Infectious Disease (N)	Transportation Incidents (M)	Winter Storm (N)	Substance Use Disorder (M)	EH - Hazardous Materials Release (M)	Drought (N)	Utility Interruption (M)	Tornado, Windstorm (N)	Extreme Temperature (N)	Hurricane, Tropical Storm, Nor' easter (N)	Terrorism (M)	Subsidence, Sinkhole (N)	EH - Conventional Oil and Gas Wells (M)	EH - Unconventional Oil and Gas (M)	EH - Coal Mining (M)	EH - Gas and Liquid Pipelines (M)	Cyber Terrorism (M)	Dam Failure (M)	Wildfire (N)	Nuclear Incidents (M)	Civil Disturbance (M)	Landslide (N)	Earthquake (N)	Radon Exposure (N)	Urban Fire and Explosion (M)	Lightning Strike (N)
Potter Township	X	X	X	X	X	X	X	X	X	X	X	X	X				X	X	X	X		X	X	X	X	X	X
Rush Township	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X		X	X	X	X	X	X
Snow Shoe Borough	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X		X				X	X	X	X	X	X
Snow Shoe Township	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X	X	X	X	X	X
Spring Township	X	X	X	X	X	X	X	X	X	X	X	X	X				X	X		X				X	X	X	X
State College Borough	X	X	X	X	X	X	X	X	X	X	X	X	X					X		X	X	X	X	X	X	X	X
Taylor Township	X	X	X	X	X	X	X	X	X	X	X	X	X	X				X		X		X	X	X	X	X	X

Table 6.3-2: Mitigation Actions Per Hazard for Each Municipality

MUNICIPALITY	Flood, Flash Flood, Ice Jam (N)	Pandemic and Infectious Disease (N)	Transportation Incidents (M)	Winter Storm (N)	Substance Use Disorder (M)	EH - Hazardous Materials Release (M)	Drought (N)	Utility Interruption (M)	Tornado, Windstorm (N)	Extreme Temperature (N)	Hurricane, Tropical Storm, Nor' easter (N)	Terrorism (M)	Subsidence, Sinkhole (N)	EH - Conventional Oil and Gas Wells (M)	EH - Unconventional Oil and Gas (M)	EH - Coal Mining (M)	EH - Gas and Liquid Pipelines (M)	Cyber Terrorism (M)	Dam Failure (M)	Wildfire (N)	Nuclear Incidents (M)	Civil Disturbance (M)	Landslide (N)	Earthquake (N)	Radon Exposure (N)	Urban Fire and Explosion (M)	Lightning Strike (N)
Union Township	X	X	X	X	X	X	X	X	X	X	X		X	X					X	X			X	X	X		X
Unionville Borough	X	X	X	X	X	X	X	X	X	X	X	X	X					X	X			X	X	X	X	X	X
Walker Township	X	X	X	X	X	X	X	X	X	X	X	X	X	X				X		X		X	X	X	X	X	X
Worth Township	X	X	X	X	X	X	X	X	X	X	X	X	X	X				X		X		X	X	X	X	X	X

*Centre Hall Borough does not have an action for flood, flash flood, ice jam because there are no flood zones in the community.

6.4 MITIGATION ACTION PLAN

Mitigation actions have been carried over from the 2021 Plan and have been newly developed for the County and participating jurisdictions. While some actions are more general in nature and could apply to more than one jurisdiction, other actions are specific to individual projects or jurisdictions. Mitigation actions were developed based on the following: issues identified in the Risk Assessment, gaps identified in the mitigation capability analysis, input from HMSC, and feedback from the HMPT.

During the Mitigation Strategy and Capability Assessment Workshops held on October 15 and 16, 2024, mitigation techniques and actions were discussed. After the meeting, municipalities were provided their Mitigation Action Progress Form, which listed their actions and projects from the 2021 HMP for review and update as described in Section 6.1. Actions that have been deferred or ongoing have been carried over to the 2025 Action Plan and are again proposed for implementation.

In addition, each participating jurisdiction was given New Mitigation Action Forms to provide any new actions or projects to be included in the plan update. New Mitigation Action Forms were also posted to the project website and set out via email. Meeting participants who were not affiliated with a municipality, organization or agency that had any actions identified in the 2021 plan were provided with New Mitigation Action Forms to include new actions in the 2025 Plan if they so wished.

The final list of 80 mitigation actions is described in Table 6.4-1 below. This table provides an overview of the strategy that will be utilized in order to implement each of the proposed mitigation actions. For each action listed in the table, the associated strategy identifies the agency or job title that will be responsible for initiating the work and potential sources of funding for the work. Each strategy also indicates a timeframe for when the action will happen. At least one mitigation action was established for each hazard in Centre County. More than one action is identified for several hazards. Every participating jurisdiction has at least one mitigation action for each hazard they have identified as being a risk (see Table 6.3-2).

Many of these mitigation actions will require substantial time commitments from staff at the County and local municipalities. While all these activities will be pursued over the next five years, the reality of limited time and resources requires the identification of the feasibility and priority level of mitigation actions. Prioritization allows the individuals and organizations involved to focus their energies and ensure progress on mitigation activities.

Table 6.4-1: 2025 Centre County Mitigation Action Plan

#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD	LEAD AGENCY/ DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
Goal 1 Reduce potential injury or death and damage to existing community assets from all hazards.							
1.1	Implement traffic calming measures at key community intersections.	All Municipalities	Structure and Infrastructure	Transportation Incidents	Local Emergency Services, Local Planning Agencies, CCMPO	Ongoing	Local Planning Funding, PennDOT
1.2	Conduct fire prevention inspections, especially in historic properties, annually.	Bellefonte Borough	Education and Awareness	Urban Fire and Explosion	Bellefonte Borough	Annually	Borough, HMGP
1.3	Continue study of stormwater runoff impacts in flood-prone area of E Street.	Bellefonte Borough	Natural Systems Protection; Structure and Infrastructure	Flood, Flash Flood, Ice Jam; Hurricane, Tropical Storm, Nor'easter	Bellefonte Borough, CCMPO	Five years	CPLP, County, PA DEP, HMGP
1.4	Obtain from PEMA Bureau of Recovery and Mitigation listings of repetitive loss properties within Centre County and distribute to	Centre County	Education and Awareness	Flood, Flash Flood, Ice Jam	Centre County Office of Emergency Services	Ongoing	Centre County OES Staff Time

Table 6.4-1: 2025 Centre County Mitigation Action Plan

#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD	LEAD AGENCY/ DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
	municipal elected officials and managers.						
1.5	Secure state or grant funding to update and adopt Act 167 Stormwater Management Plan.	Centre County	Plans and Regulations	Flood, Flash Flood, Ice Jam; Hurricane, Tropical Storm, Nor'easter	Centre County Planning and Community Development Office	Two years	PA DEP
1.6	Coordinate construction projects and winter storm response plans.	Centre County	Structure and Infrastructure	Winter Storm; Transportation Incidents	Centre County OES in coordination with CCMPO, PennDOT, and Pennsylvania State Police	Ongoing	Centre County OES
1.7	Identify water suppliers that are at greater risk to effects from drought and determine if they are candidates for interconnections from area suppliers.	Centre County	Structure and Infrastructure	Drought	Centre County Planning and Community Development Office	Five years	HMGP, DCNR
1.8	Use existing road-stream crossing data to identify bridges and culverts that	Centre County	Structure and Infrastructure	Flood, Flash Flood, & Ice Jam	Centre County Planning and Community	Five years	CCPDO

Table 6.4-1: 2025 Centre County Mitigation Action Plan

#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD	LEAD AGENCY/ DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
	are most vulnerable to ice jams.				Development Office, CCMPO		
1.9	Conduct a commodity flow study on identified transportation routes.	Centre County	Plans and Regulations	Environmental Hazards - Hazardous Materials Release	Centre County OES, LEPC	Two years	Centre County OES
1.10	Implement small water and sewer system improvements across the county.	Centre County	Structure and Infrastructure	Flood, Flash Flood, Ice Jams	Centre County Planning and Community Development Office	Ongoing	DCED CBDG
1.11	Encourage land use planning and zoning controls to minimize population growth near hazardous materials sites.	Centre County, All Municipalities	Local Plans and Regulations	Environmental Hazards - Hazardous Materials Release	Centre County Planning and Community Development Office	Ongoing	CCPDO
1.12	Maintain stockpile of PPE at county OES. Coordinate on distribution of PPE to communities as needed.	Centre County, All Municipalities	Structure and Infrastructure	Pandemic and Infectious Disease	Centre County OES, Community Officials	Ongoing	Centre County OES Department Budget
1.13	Coordinate with county, state and federal agencies on potential mitigation	Centre County, Bellefonte Borough, Benner Township, Boggs Township, Burnside Township, College Township,	Education and Awareness	Terrorism	Centre County Office of Emergency Services	Ongoing	HMGP

Table 6.4-1: 2025 Centre County Mitigation Action Plan

#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD	LEAD AGENCY/ DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
	actions for terrorist activities.	Curtin Township, Ferguson Township, Gregg Township, Harris Township, Liberty Township, Marion Township, Miles Township, Milesburg Borough, Millheim Borough, Patton Township, Penn Township, Philipsburg Borough, Port Matilda Borough, Potter Township, Rush Township, Snow Shoe Borough, Snow Shoe Township, Spring Township, State College Borough, Taylor Township, Unionville Borough, Walker Township, Worth Township					
1.14	Acquire additional generators for shelter locations.	College Township	Structure and Infrastructure	Winter Storm; Utility Interruption; Hurricane, Tropical Storm, Nor'easter; Tornado, Windstorm	Centre Region Office of Emergency Management	Five years	CCPDO, HMGP

Table 6.4-1: 2025 Centre County Mitigation Action Plan

#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD	LEAD AGENCY/ DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
1.15	Clean up debris at the railroad bridge.	Gregg Township	Structure and Infrastructure	Transportation Incidents	Gregg Township	One Year	PA DEP
1.16	Improve stormwater system drainage and/or capacity by evaluating, repairing and adding or replacing storm drains within the Borough, as well as by conducting regular maintenance for drainage systems.	Howard Borough	Structure and Infrastructure	Flood, Flash Flood, Ice Jam; Hurricane, Tropical Storm, Nor'easter	Howard Borough	Five years	CCPDO, PennDOT
1.17	Complete traffic calming measures such as installing safety and pedestrian signs at school crosswalks and on Walnut Street, and replace the red light at East Main Street, West Main Street and Walnut Street.	Howard Borough	Structure and Infrastructure	Transportation Incidents	Howard Borough, CCMPO	One to Two Years	Centre County Planning and Development, Centre County Office of Transportation, PennDOT
1.18	Identify support for maintenance of water systems	Howard Borough	Structure and Infrastructure	Flood, Flash Flood, Ice Jams; Environmental Hazards -	Howard Borough	One to Two Years	Borough Staff Time, County Staff Time

Table 6.4-1: 2025 Centre County Mitigation Action Plan

#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD	LEAD AGENCY/ DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
				Hazardous Materials Release			
1.19	Replace existing fire equipment for the Miles Township Fire Company with new equipment that meets applicable standards.	Miles Township	Structure and Infrastructure	Wildfire	Miles Township	Ongoing	Miles Township
1.20	Clean up after flooding	Milesburg Borough	Structure and Infrastructure	Flood, Flash Flood, Ice Jam	Milesburg Borough	6 months to 1 year	PEMA, HMGP
1.21	Evaluate, repair, add, and/or replace storm drains within the borough.	Millheim Borough	Structure and Infrastructure	Flood, Flash Flood, Ice Jam; Hurricane, Tropical Storm, Nor'easter	Millheim Borough	Five years	Millheim Borough, PennDOT
1.22	Widen culvert bridge on Rt. 445 (North Street, slightly north of Church St.) to handle more water flow and drainage into Elk Creek.	Millheim Borough	Structure and Infrastructure	Flood, Flash Flood, Ice Jams; Transportation Incidents	Millheim Borough, CCMPO	Five years	PennDOT
1.23	Acquire a generator for Out of the Cold's facility.	State College Borough	Structure and Infrastructure	Winter Storm; Utility	State College Borough	Five years	HMGP

Table 6.4-1: 2025 Centre County Mitigation Action Plan

#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD	LEAD AGENCY/ DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
				Interruption; Hurricane, Tropical Storm, Nor'easter; Tornado, Windstorm			
1.24	Continue development and updates of Game Action Plans, to detail response to address post-game disturbances at Penn State.	Penn State University, College Township, Ferguson Township, Halfmoon Township, Harris Township, Patton Township, State College Borough	Plans and Regulations	Civil Disturbance	Penn State University Emergency Management; Centre Region Office of Emergency Management	Annually	HMGP
1.25	Complete development and implementation of source water protection plan to prevent unfiltered chemicals from entering Tussey sinkhole and ground water supply along US Route 322.	Potter Township	Plans and Regulations	Transportation Incidents; Environmental Hazards - Hazardous Materials Release	Potter Township	Five years	PennDOT
1.26	Retrofit public buildings and Critical Facilities to	All Municipalities	Structure and Infrastructure	Earthquake; Hurricane, Tropical	Local Planning Agencies	Five years	HMGP

Table 6.4-1: 2025 Centre County Mitigation Action Plan

#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD	LEAD AGENCY/ DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
	reduce future wind and earthquake damage.			Storm, Nor'easter; Lightning Strike; Tornado, Windstorm			
1.27	Identify and execute the most cost effective floodproofing that will protect Phoenix Avenue business, residential, and critical facility (Bellefonte Emergency Medical Services) properties.	Bellefonte Borough	Structure and Infrastructure	Flood, Flash Flood, Ice Jam	Bellefonte Borough, CCMPO	Five years	CCPDO, DCED, HMGP
Goal 2 Ensure new construction and substantially improved construction is resistant to natural hazards.							
2.1	Obtain grant funding to acquire, demolish, relocate, and/or elevate structures that are vulnerable to flooding.	Centre County, Bellefonte Borough, Benner Township, Boggs Township, Burnside Township, College Township, Curtin Township, Ferguson Township, Gregg Township, Haines Township, Halfmoon Township, Harris Township, Howard Borough, Howard Township, Huston Township, Liberty Township, Marion	Structure and Infrastructure	Flood, Flash Flood, Ice Jam	Centre County Office of Emergency Services in coordination with municipalities, CCMPO	Five years	HMGP

Table 6.4-1: 2025 Centre County Mitigation Action Plan

#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD	LEAD AGENCY/ DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
		Township, Miles Township, Milesburg Borough, Millheim Borough, Patton Township, Penn Township, Philipsburg Borough, Port Matilda Borough, Potter Township, Rush Township, Snow Shoe Borough, Snow Shoe Township, Spring Township, State College Borough, Taylor Township, Union Township, Unionville Borough, Walker Township, and Worth Township					
2.2	Identify and execute the most cost-effective floodwater mitigation project to protect property and access into flood-prone community of the Village of Spring Mills.	Gregg Township	Structure and Infrastructure	Flood, Flash Flood, Ice Jam	Gregg Township	Five years	CCPDO, DCED, HMGP
2.3	Identify and execute the most cost effective floodproofing projects, including buying properties in the	Milesburg Borough	Structure and Infrastructure	Flood, Flash Flood, Ice Jam	Milesburg Borough	Five years	CCPDO, DCED, HMGP

Table 6.4-1: 2025 Centre County Mitigation Action Plan

#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD	LEAD AGENCY/ DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
	floodplain and other structural or infrastructural improvements, that will effectively protect floodplain properties in the Borough of Milesburg.						
2.4	Identify and execute the most cost-effective floodwater mitigation project to protect property and access into flood-prone community of the Village of Coburn.	Penn Township	Structure and Infrastructure	Flood, Flash Flood, Ice Jam	Penn Township, CCMPO	Five years	CCPDO, DCED, HMGP
2.5	Replace water holding tanks that do not meet current PA DEP standards.	Penn Township	Structure and Infrastructure; Natural Systems Protection	Environmental Hazards - Hazardous Material Release	Penn Township	Four years	CFA, CDBG
2.6	Work with FEMA Region 3 to deliver substantial improvement/substantial damage (SI/SD) training with information on participant-specific provisions to communities participating in the NFIP.	Centre County	Education and Awareness	Flood, Flash Flood, Ice Jam	Centre County Planning and Community Development Office	Five years	Staff Time

Table 6.4-1: 2025 Centre County Mitigation Action Plan

#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD	LEAD AGENCY/ DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
Goal 3 Improve emergency warning and response procedures and capabilities.							
3.1	Identify designated locations to go to for code blue and extreme heat days.	All Municipalities	Plans and Regulations	Extreme Temperatures	Out of the Cold	Ongoing	PA DCED
3.2	Identify drop in recovery centers and resources to support these centers.	All Municipalities	Plans and Regulations	Substance Use Disorder	Centre Helps	Ongoing	PA DHS
3.3	Obtain grant funding for fire suppression systems and equipment for large, economic anchor, buildings.	Bellefonte Borough	Structure and Infrastructure	Urban Fire and Explosion	Bellefonte Borough, Bellefonte Keystone Community Development Association	Two years	DCED
3.4	Maintain StormReady County status.	Centre County	Education and Awareness	Tornado, Windstorm; Hurricane, Tropical Storm, Nor'easter; Lightning Strike	Centre County Office of Emergency Services	Ongoing	Centre County OES, PEMA
3.5	Continue participation in and encourage continued participation by	Centre County	Education and Awareness	Terrorism	Centre County Office of	Ongoing	Centre County OES

Table 6.4-1: 2025 Centre County Mitigation Action Plan

#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD	LEAD AGENCY/ DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
	municipality first responders in South Central Mountains Regional Task Force.				Emergency Services		
3.6	Improve coordination with local municipalities to reduce risk from hazardous material incidents and conduct trainings to prepare for hazardous materials incidents.	Centre County	Education and Awareness	Environmental Hazards - Hazardous Materials Release	Centre County Office of Emergency Services	Ongoing	Centre County OES, PEMA
3.7	Provide temporary high-speed internet hot spots during an emergency in the event that broadband availability is impacted.	Centre County	Structure and Infrastructure	Utility Interruption	Centre County Office of Emergency Services	5 Years	Centre County OES
3.8	Assist with coordination between County residents and utility companies on critical outage events.	Centre County, All Municipalities	Plans and Regulations	Utility Interruption	Centre County Office of Emergency Services	Ongoing	Centre County OES
3.9	Ensure that emergency responders are training in response to incidents involving gasoline and	Centre County, Boggs Township, Burnside Township, Huston Township, Liberty Township, Marion Township, Philipsburg	Education and Awareness	Environmental Hazards - Hazardous Materials Release,	Centre County Office of Emergency Services	Ongoing	Centre County OES, PEMA

Table 6.4-1: 2025 Centre County Mitigation Action Plan

#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD	LEAD AGENCY/ DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
	other flammable liquid products.	Borough, Rush Township, Snow Shoe Borough, Snow Shoe Township, Taylor Township, Union Township, Walker Township, Worth Township		Conventional Oil and Gas Wells, Unconventional Oil and Gas Wells			
3.10	Expand participation in the Firewise Program.	College Township, Ferguson Township, Gregg Township, Halfmoon Township, Harris Township, Patton Township, Rush Township, Snow Shoe Township, State College Borough, Walker Township	Education and Awareness	Wildfire	Bureau of Forestry	Five years	Centre County OES, CCPDO, DCNR, HMGP
3.11	Continue to identify point of dispensing sites.	College Township, Ferguson Township, Halfmoon Township, Harris Township, Patton Township, State College Borough	Plans and Regulations	Pandemic and Infectious Disease	Centre Region Office of Emergency Management	Ongoing	HMGP
Goal 4 Promote hazard mitigation as a public value to be integrated in planning and policy efforts countywide in recognition of its importance to the health, safety, and welfare of the population.							
4.1	Provide information to private land owners about benefits of and obtaining crop insurance for drought protection.	All Municipalities	Education and Awareness	Drought	Penn State University – Cooperative Extension	Two years	Staff Time

Table 6.4-1: 2025 Centre County Mitigation Action Plan

#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD	LEAD AGENCY/ DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
4.2	Produce and distribute family and traveler emergency preparedness information about severe winter weather hazards.	All Municipalities	Education and Awareness	Winter Storm	Centre County OES, Local Emergency Services, Out of the Cold, Centre Helps, CCMPO	Ongoing	Staff Time
4.3	Enhance radon testing capabilities to assist homeowners, renters, or businessowners in analyzing their risk	All Municipalities	Plans and Regulations	Radon Exposure	Local Emergency Services	Ongoing	Staff Time
4.4	Provide safety training on lightning strikes to outdoor sports leagues, summer lifeguards, and other outdoor occupations.	All Municipalities	Education and Awareness	Lightning Strike	Local Emergency Services	Ongoing	Staff Time
4.5	Provide fire safety education training.	Bellefonte Borough, Benner Township, Boggs Township, Burnside Township, Centre Hall Borough, College Township, Curtin Township, Ferguson Township, Gregg Township, Halfmoon Township, Harris Township,	Education and Awareness	Urban Fire and Explosion	Municipalities and Centre Region	Annually	DCNR, HMGP

Table 6.4-1: 2025 Centre County Mitigation Action Plan

#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD	LEAD AGENCY/ DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
		Liberty Township, Marion Township, Miles Township, Milesburg Borough, Millheim Borough, Patton Township, Penn Township, Philipsburg Borough, Port Matilda Borough, Potter Township, Rush Township, Snow Shoe Borough, Snow Shoe Township, Spring Township, State College Borough, Taylor Township, Unionville Borough, Walker Township, Worth Township					
4.6	Develop response plans for potential civil disturbances.	Bellefonte Borough, Benner Township, Boggs Township, Burnside Township, Centre Hall Borough, College Township, Curtin Township, Ferguson Township, Halfmoon Township, Harris Township, Liberty Township, Marion Township, Miles Township, Milesburg Borough, Millheim Borough, Patton Township, Penn	Plans and Regulations	Civil Disturbance	Local Police	Ongoing	State College Borough, HMA

Table 6.4-1: 2025 Centre County Mitigation Action Plan

#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD	LEAD AGENCY/ DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
		Township, Philipsburg Borough, Port Matilda Borough, Potter Township, Rush Township, Snow Shoe Borough, Snow Shoe Township, State College Borough, Taylor Township, Unionville Borough, Walker Township, Worth Township					
4.7	Review floodplain ordinances annually to ensure compliance with current floodplain management and insurance standards and guidance.	Bellefonte Borough, Benner Township, Boggs Township, Burnside Township, College Township, Curtin Township, Ferguson Township, Gregg Township, Haines Township, Halfmoon Township, Harris Township, Howard Borough, Howard Township, Huston Township, Liberty Township, Marion Township, Miles Township, Milesburg Borough, Millheim Borough, Patton Township, Penn Township, Philipsburg Borough, Port Matilda Borough, Potter Township,	Plans and Regulations	Flood, Flash Flood, Ice Jam	Centre Region Office of Emergency Management; Centre County Planning and Community Development Office; Municipalities	Annually	Centre County OES, CCPDO

Table 6.4-1: 2025 Centre County Mitigation Action Plan

#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD	LEAD AGENCY/ DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
		Rush Township, Snow Shoe Township, Spring Township, State College Borough, Taylor Township, Union Township, Unionville Borough, Walker Township, Worth Township					
4.8	Provide public education and resources for identifying and reporting sinkholes, subsidence areas and areas prone to landslides.	Bellefonte Borough, Benner Township, Boggs Township, Burnside Township, College Township, Curtin Township, Ferguson Township, Haines Township, Halfmoon Township, Huston Township, Liberty Township, Marion Township, Miles Township, Milesburg Borough, Millheim Borough, Patton Township, Penn Township, Potter Township, Rush Township, Snow Shoe Borough, Snow Shoe Township, State College Borough, Taylor Township, Union Township, Unionville Borough, Walker Township, Worth Township	Education and Awareness	Subsidence, Sinkhole	All Municipalities	Two years	Haines Township, HMGP

Table 6.4-1: 2025 Centre County Mitigation Action Plan

#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD	LEAD AGENCY/ DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
4.9	Promote awareness of pipelines safety guidelines.	Bellefonte Borough, Boggs Township, Burnside Township, Curtin Township, Harris Township, Potter Township, Snow Shoe Township, Spring Township	Education and Awareness	Environmental Hazard - Gas and Liquid Pipelines	Municipalities	Ongoing	Local Staff Time, PEMA
4.10	Educate students and residents on safety protocols related to the risks associated with the nuclear reactor on Penn State University's campus.	Bellefonte Borough, College Township, State College Borough	Education and Awareness	Nuclear Incidents	Penn State University, Bellefonte Borough	Ongoing	University Staff Time
4.11	Expand wildfire training to first responders, increase outreach to local officials to explain risks, and use the fire department to include wildfire awareness in their school educational program.	Benner Township, Boggs Township, Burnside Township, College Township, Curtin Township, Ferguson Township, Gregg Township, Haines Township, Halfmoon Township, Harris Township, Howard Township, Huston Township, Liberty Township, Marion Township, Miles Township, Millheim Borough, Patton Township, Penn Township, Philipsburg Borough, Potter Township,	Education and Awareness	Wildfire	Local Emergency Services	Ongoing	Act 205 VFRA funds

Table 6.4-1: 2025 Centre County Mitigation Action Plan

#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD	LEAD AGENCY/ DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
		Rush Township, Snow Shoe Township, Spring Township, State College Borough, Taylor Township, Union Township, Walker Township, Worth Township					
4.12	Increase awareness of and participation in FEMA's Community Rating System (CRS) Program.	Centre County	Education and Awareness	Flood, Flash Flood, Ice Jam	Centre County Planning and Development	Two years	CCPDO
4.13	Enhance the participation on the County Hazard Mitigation Steering Committee	Centre County	Education and Awareness	All	Centre County OES	Three years	Centre County OES
4.14	Integrate hazard mitigation goals and objectives into County Phase II comprehensive planning efforts by developing a Hazard Mitigation Implementation Strategy chapter.	Centre County	Plans and Regulations	All	Centre County Planning and Development	Three years	CCPDO
4.15	Maintain and update threat protection program software.	Centre County	Structure and Infrastructure	Cyber Terrorism	Centre County Information	Ongoing	Centre County Information

Table 6.4-1: 2025 Centre County Mitigation Action Plan

#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD	LEAD AGENCY/ DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
					Technology Services		Technology Services
4.16	Work with Pennsylvania Department of Health to increase awareness about treating and preventing substance use disorder.	Centre County, All Municipalities	Education and Awareness	Substance Use Disorder	Centre County Department of Criminal Justice Planning	Ongoing	Centre County Department of Criminal Justice Planning, DOH
4.17	Continue to provide homeowners and developers advice on Karst topography when developing in known sinkhole prone areas.	Centre County, Bellefonte Borough, Benner Township, Burnside Township, Centre Hall Borough, College Township, Curtin Township, Ferguson Township, Gregg Township, Haines Township, Halfmoon Township, Harris Township, Howard Borough, Howard Township, Huston Township, Liberty Township, Marion Township, Miles Township, Milesburg Borough, Millheim Borough, Patton Township, Penn Township, Port Matilda Borough, Potter Township,	Education and Awareness	Subsidence, Sinkhole	Centre County Planning and Development	Ongoing	CCPDO

Table 6.4-1: 2025 Centre County Mitigation Action Plan

#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD	LEAD AGENCY/ DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
		Rush Township, Snow Shoe Township, Spring Township, State College Borough, Taylor Township, Union Township, Unionville Borough, Walker Township, Worth Township					
4.18	Provide cyber-security and awareness training to county and municipal staff to reduce risk and occurrence of phishing and malware attacks.	Centre County, Bellefonte Borough, Benner Township, Boggs Township, Burnside Township, Centre Hall Borough, College Township, Curtin Township, Ferguson Township, Haines Township, Halfmoon Township, Harris Township Howard Borough, Liberty Township, Marion Township, Miles Township, Milesburg Borough, Millheim Borough, Patton Township, Penn Township, Philipsburg Borough, Port Matilda Borough, Potter Township, Rush Township, Snow Shoe Borough, Snow Shoe Township, Spring Township, State College Borough, Taylor	Education and Awareness	Cyber Terrorism	Centre County Information Technology Services	Ongoing	Centre County Information Technology Services

Table 6.4-1: 2025 Centre County Mitigation Action Plan

#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD	LEAD AGENCY/ DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
		Township, Unionville Borough, Walker Township, Worth Township					
4.19	Develop a Centre Region Taskforce to complete a detailed After Action Report and Improvement Plan (IP) for COVID-19. The taskforce will meet regularly to ensure implementation of the IP and plan for other infectious disease issues in the Centre Region.	College Township, Ferguson Township, Halfmoon Township, Harris Township, Patton Township, State College Borough	Plans and Regulations	Pandemic and Infectious Disease	Centre Region Office of Emergency Management and Penn State University Health Services	Ongoing	Municipality, Penn State University, State College Area School District , and Local Businesses
4.20	Work with vendors of services to secure high-speed internet connection and enhance reliability throughout much of the valley where connectivity is poor.	Miles Township	Structure and Infrastructure	Utility Interruption	Miles Township	Ongoing	Miles Township
Goal 5 Protect existing natural resources, and promote the preservation of areas where the natural hazard threat potential is high.							
5.1	Increase current diking level surrounding the wastewater treatment plant.	Bellefonte Borough	Natural Systems Protection;	Flood, Flash Flood, Ice Jam; Hurricane,	Bellefonte Borough	Five years	CPLP, County, DEP, HMGP

Table 6.4-1: 2025 Centre County Mitigation Action Plan

#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD	LEAD AGENCY/ DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
			Structure and Infrastructure	Tropical Storm, & Nor'easter			
5.2	Reclaim and revegetate abandoned mine land.	Burnside Township, Curtin Township, Potter Township, Snow Shoe Borough, Snow Shoe Township	Natural Systems Protection	Environmental Hazard - Coal Mining	Local Planning Agencies, Moshannon Creek Watershed Association	Ongoing	PA DCNR
5.3	Continue to coordinate with PA State Game Commission and DCNR to conduct prescribed burns as necessary to reduce wildfire risk.	College Township, Ferguson Township, Halfmoon Township, Harris Township, Patton Township, State College Borough	Natural Systems Protection	Wildfire	Centre Region Office of Emergency Management	Five years	DCNR
5.4	Continue to restrict future development at sites within the floodplain in Ferguson Township.	Ferguson Township	Structure and Infrastructure	Flood, Flash Flood, Ice Jam	Centre Region Council of Governments	Five years	Centre Region COG, HMGP
5.5	Use natural methods in and along Elk Creek to mitigate flooding.	Millheim Borough	Natural Systems Protection	Flood, Flash Flood, Ice Jam	Millheim Borough, Centre County Conservation District	Ongoing	PA DEP, HMGP
Goal 6 Protect people and assets from the potential impacts of High Hazard Potential Dams.							

Table 6.4-1: 2025 Centre County Mitigation Action Plan

#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD	LEAD AGENCY/ DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
6.1	Build partnerships with dam owners. For the four dams with poor condition assessments (University Park Airport Pond 1a, Kephart, Penn Nursery, Rockview Reservoir) work with dam owners to identify and prioritize the repairs needed to bring the dams into compliance with dam safety standards.	Benner Township, Burnside Township, College Township, Curtin Township, Ferguson Township, Gregg Township, Haines Township, Harris Township, Liberty Township, Miles Township, Millheim Borough, Patton Township, Penn Township, Philipsburg Borough, Potter Township, Rush Township, Snow Shoe Township, Union Township, Unionville Borough	Dam Failure	Dam Failure	Local Planning Agencies, Dam Owners, CCMPO	Ongoing	Staff Time
6.2	Conduct comprehensive flood studies and vulnerability assessments for the high-hazard areas in Centre County. This will involve determining various flood recurrence intervals and developing risk assessments and mitigation strategies to improve existing infrastructure design to	Centre County Metropolitan Planning Organization	Plans and Regulations	Flood, Flash Flood, Ice Jam	Centre County Metropolitan Planning Organization, Centre County Planning and Community Development Office, CCMPO	Five years	PROTECT Grant

Table 6.4-1: 2025 Centre County Mitigation Action Plan

#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD	LEAD AGENCY/ DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
	withstand floods of specific magnitudes.						
6.3	Obtain, compile, and digitize updated Department of Environmental Protection inundation data and Emergency Action Plan vulnerability data as it becomes available to inform plan update.	Centre County	Plans and Regulations	Dam Failure	Centre County Planning and Development	Ongoing	CCPDO
6.4	Maintain a GIS layer of the location of all permitted dams within the County, categorized by priority concern. Utilize dam location layer, inundation data, building footprints, and tax parcel information to develop potential evacuation measures in the event of a breach or failure.	Centre County	Plans and Regulations	Dam Failure	Centre County Planning and Development; Centre County OES	Ongoing	CCPDO
6.5	Provide notice of funding opportunity and supporting	Centre County	Education and Awareness	Dam Failure; HHPD	Centre County OES	Annually by December (grant	Centre County OES

Table 6.4-1: 2025 Centre County Mitigation Action Plan

#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD	LEAD AGENCY/ DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
	documentation from the County HMP to EMCs and the municipality with High Hazard Potential Dams to promote rehabilitation and safety in Centre County.					applications due June each year)	
6.6	Participate in the development and continued update of Emergency Action Plans.	Centre County, Benner Township, College Township, Liberty Township, Penn Township, Rush Township	Plans and Regulations	Dam Failure	Centre County OES	Ongoing	DCNR
6.7	Move oldest and vulnerable (exposed to elements) section of Borough's main waterline from Phillips' Creek Dam to State Route 445.	Millheim Borough	Structure and Infrastructure	Flood, Flash Flood, Ice Jam; Transportation Incidents	Millheim Borough	Five years	CCPDO, DCED
6.8	Once dam hazard areas are identified, communities can consider updating land use ordinances. Consider the implications of recognizing dam inundation areas as	Benner Township, Burnside Township, College Township, Curtin Township, Ferguson Township, Gregg Township, Haines Township, Harris Township, Liberty Township, Miles Township, Millheim Borough, Patton Township, Penn Township, Philipsburg	Plans and Regulations	Dam Failure	Centre County Planning and Development	Five years	Staff Time

Table 6.4-1: 2025 Centre County Mitigation Action Plan

#	ACTION DESCRIPTION	COMMUNITY/ ORGANIZATION	CATEGORY	HAZARD	LEAD AGENCY/ DEPARTMENT	IMPLEMENTATION SCHEDULE	FUNDING SOURCE AND NOTES
	sensitive areas in zoning ordinances.	Borough, Potter Township, Rush Township, Snow Shoe Township, Union Township, Unionville Borough					
6.9	Once structures in dam hazard areas are identified, support mitigation projects that will result in the projection of public and private property from floods of specific magnitudes. Eligible projects include but are not limited to: 1) acquisition of hazard-prone structures 2) Elevation of flood-prone structures. 3) Minor structural flood control projects 4) Relocation of structures from hazard-prone areas 5) Retrofitting of existing buildings, facilities, and infrastructure	Centre County, Benner Township, College Township, Liberty Township, Penn Township, Rush Township	Structure and Infrastructure	Dam Failure	Centre County Planning and Development	Five years	FEMA HHPD, PA DCED PDFAP

Evaluating mitigation actions involves judging each action against certain criteria to determine its feasibility and potential impact. This includes a consideration of cost versus benefit, as the efficiency criteria account for costs while the other four criteria seek to understand the benefits. Actions were evaluated and prioritized by applying the Multi-Objective Mitigation Action Prioritization criteria. For each action, scores were assigned to each criterion using the following weighted, multi-objective mitigation action prioritization criteria.

Effectiveness (weight: 20% of score): The extent to which an action reduces the vulnerability of people and property.
Efficiency (weight: 30% of score): The extent to which time, effort, and cost is well used as a means of reducing vulnerability.
Multi-Hazard Mitigation (weight: 20% of score): The action reduces vulnerability for more than one hazard.
Addresses High Risk Hazard (weight: 15% of score): The action reduces vulnerability for people and property from a hazard(s) identified as high risk.
Addresses Critical Communications/Critical Infrastructure (weight: 15% of score): The action pertains to the maintenance of critical functions and structures such as transportation, supply chain management, data circuits, etc.

Scores of 1, 2, or 3 were assigned for each multi-objective mitigation action prioritization criterion where 1 is a low score and 3 is a high score. The Efficiency criterion, which considers the cost and effort of each action versus its overall vulnerability reduction benefit, is the highest weighted criterion as part of the total prioritization score. Action were prioritized using the cumulative score assigned to each. Each mitigation action was then given a priority ranking (Low, Medium, and High) based on the following:

Low Priority:	1.0 – 1.8
Medium Priority:	1.9 – 2.4
High Priority:	2.5 – 3.0

Table 6.4-2 presents the cumulative results of the prioritization of mitigation actions. Of the 80 total actions, five are ranked High Priority, 38 are ranked Medium Priority, with the remaining 37 ranked as Low Priority.

Table 6.4-2: Mitigation Action Prioritization

MITIGATION ACTIONS		MULTI-OBJECTIVE MITIGATION ACTION PRIORITIZATION CRITERIA					
		LOW = 0.0-1.8		MEDIUM = 1.9-2.4		HIGH = 2.5-3.0	
#	NAME	EFFECTIVENESS	EFFICIENCY	MULTI-HAZARD MITIGATION	ADDRESSES HIGH RISK HAZARD	ADDRESSES COMMUNICATIONS/ CRITICAL INFRASTRUCTURE	TOTAL SCORE
1.1	Implement traffic calming measures at key community intersections.	2	1	1	3	3	1.8
1.2	Conduct fire prevention inspections, especially in historic properties, annually.	2	2	1	1	1	1.5
1.3	Continue study of stormwater runoff impacts in flood-prone area of E Street.	2	3	2	3	1	2.3
1.4	Obtain from PEMA Bureau of Recovery and Mitigation listings of repetitive loss properties within Centre County and distribute to municipal elected officials and managers.	1	2	1	3	1	1.6
1.5	Secure state or grant funding to update and adopt Act 167 Stormwater Management Plan.	2	2	1	3	2	2.0
1.6	Coordinate construction projects and winter storm response plans.	2	2	2	3	1	2.0
1.7	Identify water suppliers that are at greater risk to effects from drought and determine if they are candidates for interconnections from area suppliers.	2	1	1	3	1	1.5
1.8	Use existing road-stream crossing data to identify bridges and culverts that are most vulnerable to ice jams.	1	2	1	3	3	1.9
1.9	Conduct a commodity flow study on identified transportation routes.	3	2	1	3	3	2.3
1.10	Implement small water and sewer system improvements across the county.	2	1	1	3	3	1.8
1.11	Encourage land use planning and zoning controls to minimize population growth near hazardous materials sites.	2	2	1	2	1	1.7

Table 6.4-2: Mitigation Action Prioritization

MITIGATION ACTIONS		MULTI-OBJECTIVE MITIGATION ACTION PRIORITIZATION CRITERIA					
		LOW = 0.0-1.8		MEDIUM = 1.9-2.4		HIGH = 2.5-3.0	
#	NAME	EFFECTIVENESS	EFFICIENCY	MULTI-HAZARD MITIGATION	ADDRESSES HIGH RISK HAZARD	ADDRESSES COMMUNICATIONS/ CRITICAL INFRASTRUCTURE	TOTAL SCORE
1.12	Maintain stockpile of PPE at county OES. Coordinate on distribution of PPE to communities as needed.	1	2	1	3	1	1.6
1.13	Coordinate with county, state and federal agencies on potential mitigation actions for terrorist activities.	1	2	1	2	2	1.6
1.14	Acquire additional generators for shelter locations.	3	1	3	2	3	2.3
1.15	Clean up debris at the railroad bridge.	1	1	1	1	2	1.2
1.16	Improve stormwater system drainage and/or capacity by evaluating, repairing and adding or replacing storm drains within the Borough, as well as by conducting regular maintenance for drainage systems.	2	2	2	3	3	2.3
1.17	Complete traffic calming measures such as installing safety and pedestrian signs at school crosswalks and on Walnut Street, and replace the red light at East Main Street, West Main Street and Walnut Street.	2	1	1	3	2	1.7
1.18	Identify support for maintenance of water systems	2	1	2	1	2	1.6
1.19	Replace existing fire equipment for the Miles Township Fire Company with new equipment that meets applicable standards.	2	1	1	1	3	1.5
1.20	Clean up after flooding	1	2	1	3	1	1.6
1.21	Evaluate, repair, add, and/or replace storm drains within the borough.	2	2	2	3	3	2.3

Table 6.4-2: Mitigation Action Prioritization

MITIGATION ACTIONS		MULTI-OBJECTIVE MITIGATION ACTION PRIORITIZATION CRITERIA					
		LOW = 0.0-1.8		MEDIUM = 1.9-2.4		HIGH = 2.5-3.0	
#	NAME	EFFECTIVENESS	EFFICIENCY	MULTI-HAZARD MITIGATION	ADDRESSES HIGH RISK HAZARD	ADDRESSES COMMUNICATIONS/ CRITICAL INFRASTRUCTURE	TOTAL SCORE
1.22	Widen culvert bridge on Rt. 445 (North Street, slightly north of Church St.) to handle more water flow and drainage into Elk Creek.	2	2	2	3	3	2.3
1.23	Acquire a generator for Out of the Cold's facility.	3	1	3	2	3	2.3
1.24	Continue development and updates of Game Action Plans, to detail response to address post-game disturbances at Penn State.	2	2	1	1	1	1.5
1.25	Complete development and implementation of source water protection plan to prevent unfiltered chemicals from entering Tussey sinkhole and ground water supply along US Route 322.	2	3	3	3	1	2.5
1.26	Retrofit public buildings and Critical Facilities to reduce future wind and earthquake damage.	3	1	2	3	3	2.2
1.27	Identify and execute the most cost effective floodproofing that will protect Phoenix Avenue business, residential, and critical facility (Bellefonte Emergency Medical Services) properties.	3	2	1	3	3	2.3
2.1	Obtain grant funding to acquire, demolish, relocate, and/or elevate structures that are vulnerable to flooding.	3	2	1	3	1	2.0
2.2	Identify and execute the most cost-effective floodwater mitigation project to protect property and access into flood-prone community of the Village of Spring Mills.	3	2	1	3	2	2.2

Table 6.4-2: Mitigation Action Prioritization

MITIGATION ACTIONS		MULTI-OBJECTIVE MITIGATION ACTION PRIORITIZATION CRITERIA					
		LOW = 0.0-1.8		MEDIUM = 1.9-2.4		HIGH = 2.5-3.0	
#	NAME	EFFECTIVENESS	EFFICIENCY	MULTI-HAZARD MITIGATION	ADDRESSES HIGH RISK HAZARD	ADDRESSES COMMUNICATIONS/ CRITICAL INFRASTRUCTURE	TOTAL SCORE
2.3	Identify and execute the most cost effective floodproofing projects, including buying properties in the floodplain and other structural or infrastructural improvements, that will effectively protect floodplain properties in the Borough of Milesburg.	3	2	1	3	2	2.2
2.4	Identify and execute the most cost-effective floodwater mitigation project to protect property and access into flood-prone community of the Village of Coburn.	3	2	1	3	2	2.2
2.5	Replace water holding tanks that do not meet current PA DEP standards.	3	1	1	2	1	1.6
2.6	Work with FEMA Region 3 to deliver substantial improvement/substantial damage (SI/SD) training with information on participant-specific provisions to communities participating in the NFIP.	2	3	1	2	2	2.1
3.1	Identify designated locations to go to for code blue and extreme heat days.	2	2	1	2	1	1.7
3.2	Identify drop in recovery centers and resources to support these centers.	2	2	1	2	1	1.7
3.3	Obtain grant funding for fire suppression systems and equipment for large, economic anchor, buildings.	2	2	1	1	1	1.5
3.4	Maintain StormReady County status.	2	3	3	2	1	2.4
3.5	Continue participation in and encourage continued participation by municipality first responders in South Central Mountains Regional Task Force.	1	2	1	2	2	1.6

Table 6.4-2: Mitigation Action Prioritization

MITIGATION ACTIONS		MULTI-OBJECTIVE MITIGATION ACTION PRIORITIZATION CRITERIA					
		LOW = 0.0-1.8		MEDIUM = 1.9-2.4		HIGH = 2.5-3.0	
#	NAME	EFFECTIVENESS	EFFICIENCY	MULTI-HAZARD MITIGATION	ADDRESSES HIGH RISK HAZARD	ADDRESSES COMMUNICATIONS/ CRITICAL INFRASTRUCTURE	TOTAL SCORE
3.6	Improve coordination with local municipalities to reduce risk from hazardous material incidents and conduct trainings to prepare for hazardous materials incidents.	1	2	1	2	2	1.6
3.7	Provide temporary high-speed internet hot spots during an emergency in the event that broadband availability is impacted.	1	2	1	2	3	1.8
3.8	Assist with coordination between County residents and utility companies on critical outage events.	3	2	1	1	3	2.0
3.9	Ensure that emergency responders are training in response to incidents involving gasoline and other flammable liquid products.	1	2	1	2	2	1.6
3.10	Expand participation in the Firewise Program.	2	2	1	2	1	1.7
3.11	Continue to identify point of dispensing sites.	2	2	1	2	1	1.7
4.1	Provide information to private land owners about benefits of and obtaining crop insurance for drought protection.	3	3	1	3	1	2.3
4.2	Produce and distribute family and traveler emergency preparedness information about severe winter weather hazards.	2	2	1	3	2	2.0
4.3	Enhance radon testing capabilities to assist homeowners, renters, or businessowners in analyzing their risk	2	2	1	1	1	1.5

Table 6.4-2: Mitigation Action Prioritization

MITIGATION ACTIONS		MULTI-OBJECTIVE MITIGATION ACTION PRIORITIZATION CRITERIA					
		LOW = 0.0-1.8		MEDIUM = 1.9-2.4		HIGH = 2.5-3.0	
#	NAME	EFFECTIVENESS	EFFICIENCY	MULTI-HAZARD MITIGATION	ADDRESSES HIGH RISK HAZARD	ADDRESSES COMMUNICATIONS/ CRITICAL INFRASTRUCTURE	TOTAL SCORE
4.4	Provide safety training on lightning strikes to outdoor sports leagues, summer lifeguards, and other outdoor occupations.	1	2	1	1	1	1.3
4.5	Provide fire safety education training.	2	2	1	1	1	1.5
4.6	Develop response plans for potential civil disturbances.	2	2	1	1	2	1.7
4.7	Review floodplain ordinances annually to ensure compliance with current floodplain management and insurance standards and guidance.	2	3	1	3	2	2.3
4.8	Provide public education and resources for identifying and reporting sinkholes, subsidence areas and areas prone to landslides.	2	3	1	2	2	2.1
4.9	Promote awareness of pipelines safety guidelines.	2	1	1	1	2	1.4
4.10	Educate students and residents on safety protocols related to the risks associated with the nuclear reactor on Penn State University's campus.	1	1	1	1	1	1.0
4.11	Expand wildfire training to first responders, increase outreach to local officials to explain risks, and use the fire department to include wildfire awareness in their school educational program.	2	3	1	1	2	2.0
4.12	Increase awareness of and participation in FEMA's Community Rating System (CRS) Program.	3	3	1	3	1	2.3
4.13	Enhance the participation on the County Hazard Mitigation Steering Committee	3	2	3	3	3	2.7

Table 6.4-2: Mitigation Action Prioritization

MITIGATION ACTIONS		MULTI-OBJECTIVE MITIGATION ACTION PRIORITIZATION CRITERIA					
		LOW = 0.0-1.8		MEDIUM = 1.9-2.4		HIGH = 2.5-3.0	
#	NAME	EFFECTIVENESS	EFFICIENCY	MULTI-HAZARD MITIGATION	ADDRESSES HIGH RISK HAZARD	ADDRESSES COMMUNICATIONS/ CRITICAL INFRASTRUCTURE	TOTAL SCORE
4.14	Integrate hazard mitigation goals and objectives into County Phase II comprehensive planning efforts by developing a Hazard Mitigation Implementation Strategy chapter.	3	3	3	3	2	2.9
4.15	Maintain and update threat protection program software.	2	3	1	1	3	2.1
4.16	Work with Pennsylvania Department of Health to increase awareness about treating and preventing substance use disorder.	1	2	1	2	2	1.6
4.17	Continue to provide homeowners and developers advice on Karst topography when developing in known sinkhole prone areas.	2	3	1	2	1	2.0
4.18	Provide cyber-security and awareness training to county and municipal staff to reduce risk and occurrence of phishing and malware attacks.	1	2	1	1	3	1.6
4.19	Develop a Centre Region Taskforce to complete a detailed After Action Report and Improvement Plan (IP) for COVID-19. The taskforce will meet regularly to ensure implementation of the IP and plan for other infectious disease issues in the Centre Region.	1	3	1	3	1	1.9
4.20	Work with vendors of services to secure high-speed internet connection and enhance reliability throughout much of the valley where connectivity is poor.	2	2	1	2	3	2.0
5.1	Increase current diking level surrounding the wastewater treatment plant.	3	2	1	3	3	2.3
5.2	Reclaim and revegetate abandoned mine land.	2	1	1	1	2	1.4

Table 6.4-2: Mitigation Action Prioritization

MITIGATION ACTIONS		MULTI-OBJECTIVE MITIGATION ACTION PRIORITIZATION CRITERIA					
		LOW = 0.0-1.8		MEDIUM = 1.9-2.4		HIGH = 2.5-3.0	
#	NAME	EFFECTIVENESS	EFFICIENCY	MULTI-HAZARD MITIGATION	ADDRESSES HIGH RISK HAZARD	ADDRESSES COMMUNICATIONS/ CRITICAL INFRASTRUCTURE	TOTAL SCORE
5.3	Continue to coordinate with PA State Game Commission and DCNR to conduct prescribed burns as necessary to reduce wildfire risk.	3	3	1	2	3	2.5
5.4	Continue to restrict future development at sites within the floodplain in Ferguson Township.	3	3	1	3	3	2.6
5.5	Use natural methods in and along Elk Creek to mitigate flooding.	1	2	2	3	2	2.0
6.1	Build partnerships with dam owners. For the four dams with poor condition assessments (University Park Airport Pond 1a, Kephart, Penn Nursery, Rockview Reservoir) work with dam owners to identify and prioritize the repairs needed to bring the dams into compliance with dam safety standards.	2	2	1	1	3	1.8
6.2	Conduct comprehensive flood studies and vulnerability assessments for the high-hazard areas in Centre County. This will involve determining various flood recurrence intervals and developing risk assessments and mitigation strategies to improve existing infrastructure design to withstand floods of specific magnitudes.	3	2	1	3	2	2.2
6.3	Obtain and compile updated Department of Environmental Protection inundation data and Emergency Action Plan vulnerability data as it becomes available to inform plan update.	1	1	1	2	2	1.3

Table 6.4-2: Mitigation Action Prioritization

MITIGATION ACTIONS		MULTI-OBJECTIVE MITIGATION ACTION PRIORITIZATION CRITERIA					
		LOW = 0.0-1.8		MEDIUM = 1.9-2.4		HIGH = 2.5-3.0	
#	NAME	EFFECTIVENESS	EFFICIENCY	MULTI-HAZARD MITIGATION	ADDRESSES HIGH RISK HAZARD	ADDRESSES COMMUNICATIONS/ CRITICAL INFRASTRUCTURE	TOTAL SCORE
6.4	Maintain a GIS layer of the location of all permitted dams within the County, categorized by priority concern. Utilize dam location layer, inundation data, building footprints, and tax parcel information to develop potential evacuation measures in the event of a breach or failure.	2	2	2	1	3	2.0
6.5	Provide notice of funding opportunity and supporting documentation from the County HMP to EMCs and the municipality with High Hazard Potential Dams to promote rehabilitation and safety in Centre County.	1	3	1	1	3	1.9
6.6	Participate in the development and continued update of Emergency Action Plans.	2	2	2	2	2	2.0
6.7	Move oldest and vulnerable (exposed to elements) section of Borough's main waterline from Phillips' Creek Dam to State Route 445.	3	1	2	3	3	2.2
6.8	Once dam hazard areas are identified, communities can consider updating land use ordinances. Consider the implications of recognizing dam inundation areas as sensitive areas in zoning ordinances.	2	1.5	2	3	2	2.0
6.9	Once structures in dam hazard areas are identified, support mitigation projects that will result in the projection of public and private property from floods of specific magnitudes. Eligible projects include but are not limited to: 1) acquisition of hazard-prone structures 2) Elevation of flood-prone structures. 3)	3	1	2	3	3	2.2

Table 6.4-2: Mitigation Action Prioritization

MITIGATION ACTIONS		MULTI-OBJECTIVE MITIGATION ACTION PRIORITIZATION CRITERIA					
		LOW = 0.0-1.8		MEDIUM = 1.9-2.4		HIGH = 2.5-3.0	
#	NAME	EFFECTIVENESS	EFFICIENCY	MULTI-HAZARD MITIGATION	ADDRESSES HIGH RISK HAZARD	ADDRESSES COMMUNICATIONS/ CRITICAL INFRASTRUCTURE	TOTAL SCORE
	Minor structural flood control projects 4) Relocation of structures from hazard-prone areas 5) Retrofitting of existing buildings, facilities, and infrastructure						

7. PLAN MAINTENANCE

7.1 UPDATE PROCESS SUMMARY

Once this plan has received approval from PEMA and FEMA, the plan will be adopted by the Centre County Board of Commissioners and all participating jurisdictions. This HMP Update is intended to be a 'living document.' Plan adoption is not considered the final step in the planning process, but rather as a first step to 'realization.' The plan monitoring and maintenance schedule is a cycle of events that involve periodic review, adjustments, and improvement. Plan monitoring also provides an opportunity to recognize other planning initiatives within the county that may benefit from the incorporation of risk and/or mitigation objectives detailed in this HMP. This section establishes a method to monitor how the plan will be evaluated and maintained.

7.2 MONITORING, EVALUATING, AND UPDATING THE PLAN

Monitoring, evaluating, and updating this plan is critical to maintaining its value and success in Centre County's hazard mitigation efforts. Ensuring effective implementation of mitigation activities paves the way for continued momentum in the planning process and gives direction for the future. This section explains who will be responsible for maintenance activities and what those responsibilities entail. It also provides a methodology and schedule of maintenance activities including a description of how the public will be involved on a continued basis. The HMSC elected to keep the methodology and schedule similar to what is outlined in the 2021 HMP and will continue to put more emphasis on integrating the mitigation goals, objectives, and actions identified in the Mitigation Strategy into the other ongoing planning efforts to ensure implementation and tracking of actions throughout the five-year plan maintenance process.

The HMSC established for the 2025 HMP is designated to lead plan maintenance processes of monitoring, evaluation, and updating with support and representation from all participating municipalities. The HMSC will coordinate maintenance efforts, but the input needed for effective periodic evaluations will come from community representatives, local emergency management coordinators and planners, the general public, and other stakeholders, including Penn State University and state agencies. The HMSC will oversee the progress made on the implementation of action items identified in the 2025 HMP and modify actions, as needed, to reflect changing conditions. The HMSC will meet annually to discuss specific coordination efforts that may be needed with other stakeholders. The Centre County OES Director and/or the Centre County Planning and Community Development Director will lead the HMSC during the annual reviews.

CCPCDO will lead the effort to integrate mitigation goals, objectives, and actions into the county and regional comprehensive planning efforts. Specifically, CCPCDO will ensure risk assessments and applicable mitigation actions are included in the development of comprehensive planning documents. CCPCDO will report to the HMSC the progress of these actions and will identify if there are changes that need to be made to the risk assessment or the mitigation strategy based on information developed during the comprehensive planning process.

Each municipality will designate a community representative to monitor mitigation activities and hazard events within their respective communities. The local emergency management coordinator would be suitable for this role. This individual will be asked to work with the HMSC to provide updates on applicable mitigation actions and feedback on changing hazard vulnerabilities within their community.

In addition, the municipal monitor will be responsible for reviewing the planning and land use regulatory element of the municipality's capability assessment to identify potential opportunities for continued incorporation of the HMP into local planning mechanisms and will also identify locally generated plans, information, reports, etc. that may be capable of being incorporated into the update of the 2025 HMP.

The HMSC will oversee the progress made on the implementation of action items at least annually, but also as deemed necessary based on the occurrence of a disaster or another occasion that necessitates the review of the HMP. Evaluation of the 2025 HMP will not only include an investigation of whether mitigation actions were completed, but also an assessment of how effective those actions were in mitigating losses. A review of the qualitative and quantitative benefits (or avoided losses) of mitigation activities will support this assessment. Results of the evaluation will then be compared to the goals and objectives established in the plan and decisions will be made regarding whether actions should be discontinued or modified in any way in light of new developments in the community. Progress will be documented by the HMSC for use in the next HMP Update.

Upon each HMP evaluation, the HMSC will consider whether applications should be submitted for existing mitigation grant programs. A decision to apply for funding will be based on appropriate eligibility and financial need requirements. All state and federal mitigation funding provided to the County or local municipalities will be reported in subsequent plan updates.

The 2025 HMP will be updated by the FEMA approved five-year anniversary date, as required by the Disaster Mitigation Act of 2000, or following a disaster event. This update will include working with both PEMA and FEMA on the development of a Scope of Work. Future plan updates will account for any new hazard vulnerabilities, special circumstances, or new information that becomes available. This may include additional

data that can make hazard vulnerability analysis more detailed, leading to a better understanding of risk and how to both identify and prioritize mitigation actions. During the five-year review process, the following questions will be considered as criteria for assessing the effectiveness of the Centre County HMP:

- Has the nature or magnitude of hazards affecting the county changed?
- Are there new hazards that have the potential to impact the county?
- Is there updated, or more quantitative, risk assessment data available related to the identified hazards in the plan? Can this data be integrated into the analysis to better assess the vulnerability, and depict the risk, of communities to the hazards?
- Do the identified goals and actions address current and expected conditions?
- Have mitigation actions been implemented or completed?
- Has the implementation of identified mitigation actions resulted in expected outcomes?
- Are current resources adequate to implement the plan?
- Should additional local resources be committed to address identified hazards?
- Are there current or upcoming planning mechanisms or initiatives in which the mitigation strategy should be considered for integration?

Issues that arise during monitoring and evaluation which require changes to the risk assessment, mitigation strategy, and other components of the plan will be incorporated during future updates.

7.3 CONTINUED PUBLIC INVOLVEMENT

As was done during development of this 2025 HMP, the HMSC plans to involve the public during annual review periods by providing an opportunity to review and submit feedback. The public will have access to the current HMP through their local municipal office or on the Centre County government website. Some rural areas in the County do not have internet access and require communication through physical means. Information on upcoming events related to the HMP or solicitation for comments will be announced via newsletters, newspapers, mailings, and the county website. The public is encouraged to submit comments on the HMP at any time. The HMSC will incorporate all relevant comments during the next update of the hazard mitigation plan.

Comprehensive Plans, Capital Improvements Programs, Building Codes, Municipal Floodplain Management Regulations, Emergency Operations Plans, and Zoning Ordinances are identified for incorporation of hazard mitigation actions once the 2025 HMP is adopted. Each of these mechanisms will continue to be used to meet the intent of this Plan, as appropriate. Likewise, as these planning mechanisms are updated, they will be considered for incorporation into the HMP during the annual review process and/or the five-year cycle update.

The County and participating jurisdictions may propose additional mitigation actions for inclusion throughout the five-year cycle but must submit new mitigation actions through the Centre County OES and CCPCDO, which will request an HMP amendment by contacting the PEMA State Hazard Mitigation Planner. FEMA must officially approve all additions and will amend the HMP by issuing an HMP Amendment Approval letter.

8. PLAN ADOPTION

The Plan was submitted to the Pennsylvania State Hazard Mitigation Officer on February 17, 2025 and was forwarded to FEMA for final review and approval-pending-adoption on February 28, 2025. FEMA granted approval-pending-adoption on May 5, 2025. Full approval from FEMA was received after each jurisdiction adopted the plan.

This section of the plan includes copies of the local adoption resolutions passed by Centre County and its municipal governments. Adoption resolution templates are provided to assist the County and municipal governments with recommended language for future adoption of the HMP. The completed Local Mitigation Plan Review Crosswalk is included as an appendix to this plan.

Centre County 2025 Hazard Mitigation Plan Update

County Adoption Resolution

Resolution No. _____

Centre County, Pennsylvania

WHEREAS, the municipalities of Centre County, Pennsylvania are most vulnerable to natural and human-caused hazards which may result in loss of life and property, economic hardship, and threats to public health and safety, and

WHEREAS, Section 322 of the Disaster Mitigation Act of 2000 (DMA 2000) requires state and local governments to develop and submit for approval to the President a mitigation plan that outlines processes for identifying their respective natural hazards, risks, and vulnerabilities, and

WHEREAS, Centre County acknowledges the requirements of Section 322 of DMA 2000 to have an approved Hazard Mitigation Plan as a prerequisite to receiving post-disaster Hazard Mitigation Grant Program funds, and

WHEREAS, the Centre County 2025 Hazard Mitigation Plan Update has been developed by the Centre County Office of Emergency Services and the Centre County Planning and Community Development Office in cooperation with other county departments, local municipal officials, institutional stakeholders, and the citizens of Centre County, and

WHEREAS, a public involvement process consistent with the requirements of DMA 2000 was conducted to develop the Centre County 2025 Hazard Mitigation Plan Update, and

WHEREAS, the Centre County 2025 Hazard Mitigation Plan Update recommends mitigation activities that will reduce losses to life and property affected by both natural and human-caused hazards that face the County and its municipal governments,

NOW THEREFORE BE IT RESOLVED by the governing body for the County of Centre that:

- The Centre County 2025 Hazard Mitigation Plan Update is hereby adopted as the official Hazard Mitigation Plan of the County, and
- The respective officials and agencies identified in the implementation strategy of the Centre County 2025 Hazard Mitigation Plan Update are hereby directed to implement the recommended activities assigned to them.

ADOPTED, this _____ day of _____, 202_

ATTEST:

_____

CENTRE COUNTY COMMISSIONERS

By _____

By _____

By _____

Centre County 2025 Hazard Mitigation Plan Update

Municipal Adoption Resolution

Resolution No. _____

<Borough/Township of Municipality Name>, Centre County, Pennsylvania

WHEREAS, the *<Borough/Township of Municipality Name>*, Centre County, Pennsylvania is most vulnerable to natural and human-caused hazards which may result in loss of life and property, economic hardship, and threats to public health and safety, and

WHEREAS, Section 322 of the Disaster Mitigation Act of 2000 (DMA 2000) requires state and local governments to develop and submit for approval to the President a mitigation plan that outlines processes for identifying their respective natural hazards, risks, and vulnerabilities, and

WHEREAS, the *<Borough/Township of Municipality Name>* acknowledges the requirements of Section 322 of DMA 2000 to have an approved Hazard Mitigation Plan as a prerequisite to receiving post-disaster Hazard Mitigation Grant Program funds, and

WHEREAS, the Centre County 2025 Hazard Mitigation Plan Update has been developed by the Centre County Office of Emergency Services and the Centre County Planning and Community Development Office in cooperation with other county departments, local municipal officials, institutional stakeholders, and the citizens of Centre County, and

WHEREAS, a public involvement process consistent with the requirements of DMA 2000 was conducted to develop the Centre County 2025 Hazard Mitigation Plan Update, and

WHEREAS, the Centre County 2025 Hazard Mitigation Plan Update recommends mitigation activities that will reduce losses to life and property affected by both natural and human-caused hazards that face the County and its municipal governments,

NOW THEREFORE BE IT RESOLVED by the governing body for the *<Borough/Township of Municipality Name>*:

- The Centre County 2025 Hazard Mitigation Plan Update is hereby adopted as the official Hazard Mitigation Plan of the *<Borough/Township>*, and
- The respective officials and agencies identified in the implementation strategy of the Centre County 2025 Hazard Mitigation Plan Update are hereby directed to implement the recommended activities assigned to them.

ADOPTED, this _____ day of _____, 202_

ATTEST: *<BOROUGH/TOWNSHIP OF MUNICIPALITY NAME>*

_____ By _____

By _____

9. APPENDICES

Appendix A Bibliography

Appendix B Local Mitigation Plan Review Crosswalk

Appendix C Meeting and Other Participation Documentation

Appendix D Local and Regional Flood Vulnerability Maps

Appendix E Critical Facilities and Community Lifelines

Appendix F Hazus Methodology and Results Report

Appendix G Dam Failure Hazard Profile (Section 4.3.16)

Appendix H Outreach and Engagement Plan

NB-2

CENTRE COUNTY
PENNSYLVANIA

Dear Municipal Official,

The Centre County Hazard Mitigation Plan (HMP) has officially received the Approvable Pending Adoption (APA) designation from FEMA. Thank you for all your input, collaboration, and support in getting to this point. The County adopted the plan on June 17, 2025.

See the final plan here:
https://drive.google.com/file/d/1CumXWTpPTjl8W0Br1_iX2W8DYqKHsV7Y/view?pli=1

The final step in this process is for your municipality to adopt the plan. Plan adoption makes your community eligible for certain FEMA assistance and grant funding. To make the adoption process easy for you, we have attached an adoption resolution template for completion. You may use this at your next board, council, or commission meeting.

Once adopted, you must send a copy of the signed resolution back to Jody Lair at jllair@centrecountypa.gov. The county will then submit it to FEMA, who will provide a letter of recognition to each adopting municipality.

If you have any questions about the adoption process, please contact Jody Lair at jllair@centrecountypa.gov or (814) 355-6745.

Sent on behalf of the Centre County Hazard Mitigation Plan Steering Committee:

- Jody Lair, Director of Emergency Services, Centre County Office of Emergency Services
- Domer Smeltzer, Deputy Director of Emergency Services, Centre County Office of Emergency Services
- Ray Stolinas, Director, Centre County Planning and Community Development Office
- Liz Lose, Assistant Director, Centre County Planning and Community Development Office
- Elyse Crawford, Planner, Centre County Planning and Community Development Office
- Devon Benne, Project Manager, Michael Baker International

Jody L. Lair
Director of Emergency Services
420 Holmes Street
Bellefonte, PA 16823
814-355-6745
Email: jllair@centrecountypa.gov

CENTRE COUNTY
PENNSYLVANIA

COLLEGE TOWNSHIP WATER AUTHORITY

CENTRE COUNTY PENNSYLVANIA

RESOLUTION NUMBER: #R25-03

A RESOLUTION OF THE COLLEGE TOWNSHIP WATER AUTHORITY, CENTRE COUNTY, PENNSYLVANIA, ADOPTING THE CENTRE COUNTY 2025 HAZARD MITIGATION PLAN UPDATE

WHEREAS, the College Township Water Authority, Centre County, Pennsylvania, is most vulnerable to natural and human-caused hazards, which may result in loss of life and property, economic hardship, and threats to public health and safety, and

WHEREAS, Section 322 of the Disaster Mitigation Act of 2000 (DMA 2000) requires state and local governments to develop and submit for approval to the President a mitigation plan that outlines processes for identifying their respective natural hazards, risks, and vulnerabilities, and

WHEREAS, the College Township Water Authority acknowledges the requirements of section 322 of DMA 2000 to have an approved Hazard Mitigation Plan as a prerequisite to receiving post-disaster Hazard Mitigation Grant Program funds, and

WHEREAS, the Centre County 2025 Hazard Mitigation Plan Update has been developed by the Centre County Office of Emergency Services and the Centre County Planning and Community Development Office in cooperation with other county departments, local municipal officials, institutional stakeholders, and the citizens of Centre County and

WHEREAS, a public involvement process consistent with the requirements of DMA 2000 was conducted to develop the Centre County 2025 Hazard Mitigation Plan Update, and

WHEREAS, the Centre County 2025 Hazard Mitigation Plan Update recommends mitigation activities that will reduce losses to life and property affected by both natural and human-caused hazards that face the County and its municipal governments.

NOW, THEREFORE, BE IT RESOLVED by the College Township Water Authority, Township of College, Centre County, Pennsylvania:

- The Centre County 2025 Hazard Mitigation Plan Update is hereby adopted as the official Hazard Mitigation Plan of the College Township Water Authority, Centre County, Pennsylvania, and
- The respective officials and agencies identified in the implementation strategy of the Centre County 2025 Hazard Mitigation Plan Update are hereby directed to implement the recommended activities assigned to them.

ADOPTED this 6th day of August 2025, by the College Township Water Authority, Centre County, Pennsylvania.

COLLEGE TOWNSHIP WATER AUTHORITY

BY_____
Donald Hartzell, College Township Water Authority Chair.

ATTEST:

_____
Adam T. Brumbaugh
Open Records Officer & Recording Secretary

NB-3

August 4, 2025

Members of the Authority
College Township Water Authority
1481 East College Avenue
State College, PA 16801

We have audited the financial statements of the College Township Water Authority for the year ended December 31, 2024, and have issued our report thereon dated August 4, 2025. Professional standards require that we provide you with information about our responsibilities under generally accepted auditing standards, as well as certain information related to the planned scope and timing of our audit. We have communicated such information in our engagement letter to you dated February 10, 2025. Professional standards also require that we communicate to you the following information related to our audit.

Significant Audit Matters

Qualitative Aspects of Accounting Practices

Management is responsible for the selection and use of appropriate accounting policies. The significant accounting policies used by the Authority are described in the financial statements. No new accounting policies were adopted and the application of existing policies was not changed during the year ended December 31, 2024. We noted no transactions entered into by the Authority during the year for which there is a lack of authoritative guidance or consensus. All significant transactions have been recognized in the financial statements in the proper period.

Accounting estimates are an integral part of the financial statements prepared by management and are based on management's knowledge and experience about past and current events and assumptions about future events. Certain accounting estimates are particularly sensitive because of their significance to the financial statements and because of the possibility that future events affecting them may differ significantly from those expected. Management's estimates were reasonable in relation to the financial statements taken as a whole. Certain financial statement disclosures are particularly sensitive because of their significance to financial statement users. The financial statement disclosures are neutral, consistent, and clear.

Difficulties Encountered in Performing the Audit

We encountered no significant difficulties in dealing with management in performing and completing our audit.

Corrected and Uncorrected Misstatements

Professional standards require us to accumulate all known and likely misstatements identified during the audit, other than those that are clearly trivial, and communicate them to the appropriate level of management. Management has corrected all such misstatements. In addition, none of the misstatements detected as a result of audit procedures and corrected by management were material, either individually or in the aggregate, to the financial statements taken as a whole.

Disagreements with Management

For purposes of this letter, professional standards define a disagreement with management as a financial accounting, reporting, or auditing matter, whether or not resolved to our satisfaction, that could be significant to the financial statements or the auditor's report. We are pleased to report that no such disagreements arose during the course of our audit.

Management Representations

We have requested certain representations from management that are included in the management representation letter dated August 4, 2025.

Management Consultations with Other Independent Accountants

In some cases, management may decide to consult with other accountants about auditing and accounting matters, similar to obtaining a "second opinion" on certain situations. If a consultation involves application of an accounting principle to the Authority's financial statements or a determination of the type of auditor's opinion that may be expressed on those statements, our professional standards require the consulting accountant to check with us to determine that the consultant has all the relevant facts. To our knowledge, there were no such consultations with other accountants.

Other Audit Findings or Issues

We generally discuss a variety of matters, including the application of accounting principles and auditing standards, with management each year prior to retention as the Authority's auditors. However, these

discussions occurred in the normal course of our professional relationship and our responses were not a condition to our retention.

Restriction on Use

This information is intended solely for the information and use of the Authority Members and management of the College Township Water Authority and is not intended to be, and should not be, used by anyone other than these specified parties.

Fiore Fedeli Snyder Carothers, LLP

COLLEGE TOWNSHIP WATER AUTHORITY
CENTRE COUNTY, PENNSYLVANIA

REPORT ON AUDIT OF
FINANCIAL STATEMENTS
AND SUPPLEMENTARY INFORMATION

YEARS ENDED DECEMBER 31, 2024 AND 2023

COLLEGE TOWNSHIP WATER AUTHORITY
TABLE OF CONTENTS
YEARS ENDED DECEMBER 31, 2024 AND 2023

	PAGE
Independent Auditors' Report	1 - 3
Management's Discussion and Analysis	4 - 9
Financial Statements:	
Statements of Net Position	10
Statements of Revenues, Expenses and Changes in Net Position	11
Statements of Cash Flows	12
Notes to Financial Statements	13 - 21
Supplementary Schedule:	
Schedule of Revenues, Expenses and Debt Service - Budget vs. Actual	22
Report on Internal Control over Financial Reporting and on Compliance and Other Matters Based on an Audit of Financial Statements Performed in Accordance with Government Auditing Standards	23 - 24

INDEPENDENT AUDITORS' REPORT

Members of the Authority
College Township Water Authority
State College, Pennsylvania

Opinion

We have audited the accompanying financial statements of College Township Water Authority (the "Authority"), which comprise the statements of net position as of December 31, 2024 and 2023, and the related statements of revenues, expenses and changes in net position, and cash flows for the years then ended, and the related notes to the financial statements.

In our opinion, the financial statements referred to above present fairly, in all material respects, the financial position of College Township Water Authority as of December 31, 2024 and 2023, and the results of its operations and its cash flows for the years then ended in accordance with accounting principles generally accepted in the United States of America.

Basis for Opinion

We conducted our audit in accordance with auditing standards generally accepted in the United States of America ("GAAS") and the standards applicable to financial audits contained in *Government Auditing Standards*, issued by the Comptroller General of the United States. Our responsibilities under those standards are further described in the Auditors' Responsibilities for the Audit of the Financial Statements section of our report. We are required to be independent of College Township Water Authority and to meet our ethical responsibilities, in accordance with the relevant ethical requirements relating to our audit. We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit.

Responsibilities of Management for the Financial Statements

Management is responsible for the preparation and fair presentation of these financial statements in accordance with accounting principles generally accepted in the United States of America, and for the design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the financial statements, management is required to evaluate whether there are conditions or events, considered in the aggregate, that raise substantial doubt about the Authority's ability to continue as a going concern for twelve months beyond the financial statement date, including any currently known information that may raise substantial doubt shortly thereafter.

Auditors' Responsibilities for the Audit of the Financial Statements

Our objectives are to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes our opinion. Reasonable assurance is a high level of assurance but is not absolute assurance and therefore is not a guarantee that an audit conducted in accordance with generally accepted auditing standards and *Government Auditing Standards* will always detect a material misstatement when it exists. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control. Misstatements are considered material if there is a substantial likelihood that, individually or in the aggregate, they would influence the judgement made by a reasonable user based on the financial statements.

In performing an audit in accordance with GAAS and *Government Auditing Standards*, we

- Exercise professional judgement and maintain professional skepticism throughout the audit.
- Identify and assess the risks of material misstatement of the financial statements, whether due to fraud or error, and design and perform audit procedures responsive to those risks. Such procedures include examining, on a test basis, evidence regarding the amounts and disclosures in the financial statements.
- Obtain an understanding of internal control relevant to the audit in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the Authority's internal control. Accordingly, no such opinion is expressed.
- Evaluate the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluate the overall presentation of the financial statements.
- Conclude whether, in our judgement, there are conditions or events, considered in the aggregate, that raise substantial doubt about the Authority's ability to continue as a going concern for a reasonable period of time.

We are required to communicate with those charged with governance regarding, among other matters, the planned scope and timing of the audit, significant audit findings, and certain internal control-related matters that we identified during the audit.

Required Supplementary Information

Accounting principles generally accepted in the United States of America require that the management's discussion and analysis on pages 4 through 9 be presented to supplement the basic financial statements. Such information is the responsibility of management and, although not a part

of the basic financial statements, is required by the Governmental Accounting Standards Board who considers it to be an essential part of financial reporting for placing the basic financial statements in an appropriate operational, economic, or historical context. We have applied certain limited procedures to the required supplementary information in accordance with auditing standards generally accepted in the United States of America, which consisted of inquiries of management about the methods of preparing the information and comparing the information for consistency with management's responses to our inquiries, the basic financial statements, and other knowledge we obtained during our audit of the basic financial statements. We do not express an opinion or provide any assurance on the information because the limited procedures do not provide us with sufficient evidence to express an opinion or provide any assurance.

Supplementary Information

Our audit was conducted for the purpose of forming an opinion on the basic financial statements that collectively comprise the Authority's basic financial statements. The accompanying budgetary comparison information on page 22 is presented for the purpose of additional analysis and is not a required part of the basic financial statements. Such budgetary comparison information is the responsibility of management and was derived from and relates directly to the underlying accounting and other records used to prepare the basic financial statements. The information has been subjected to the auditing procedures applied in the audit of the basic financial statements and certain additional procedures, including comparing and reconciling such information directly to the underlying accounting and other records used to prepare the basic financial statements themselves, and other additional procedures in accordance with auditing standards generally accepted in the United States of America. In our opinion, the budgetary comparison information is fairly stated, in all material respects, in relation to the financial statements as a whole.

Other Reporting Required by Government Auditing Standards

In accordance with *Government Auditing Standards*, we have also issued our report dated July 7, 2025 on our consideration of College Township Water Authority's internal control over financial reporting and on our tests of its compliance with certain provisions of laws, regulations, contracts and grant agreements and other matters. The purpose of that report is solely to describe the scope of our testing of internal control over financial reporting and compliance and the results of that testing, and not to provide an opinion on the effectiveness of the Authority's internal control over financial reporting or on compliance. That report is an integral part of an audit performed in accordance with *Government Auditing Standards* in considering College Township Water Authority's internal control over financial reporting and compliance.

Fiore Fedeli Snyder Carothers, LLP
July 7, 2025

COLLEGE TOWNSHIP WATER AUTHORITY
MANAGEMENT'S DISCUSSION AND ANALYSIS
(Required Supplemental Information)
Years Ended December 31, 2024 and 2023

To the Members of the Authority
College Township Water Authority
State College, Pennsylvania

As management of the College Township Water Authority, (the "Authority"), we offer readers of our basic financial statements this narrative introduction, overview and analysis of the financial activities of the Authority for the fiscal year ended December 31, 2024. The reader should use the information contained here in conjunction with the additional information contained in the Authority's audited financial statements which begin immediately following this narrative.

Financial Highlights of 2024

1. Net position increased by $17,661.

2. $3.23 million of the Water Revenue Note, Series 2022, remains available to fund projects via drawdown loan structure of the obligation through December 5, 2025.

3. Outlay for capital investment in meters, tools, equipment and infrastructure totaled $230,606.

4. Total investment in developing the Oak Hall Water Source was $18,178 as of December 31, 2024.

5. The 2020 Ten Year Capital Improvement Plan continued to drive planned water system improvements.

Overview of the Financial Statements

This discussion and analysis is intended to serve as an introduction to the Authority's basic financial statements. Since the Authority is engaged only in business-type activities, its basic financial statements are comprised of two components: 1) proprietary fund financial statements and 2) notes to the financial statements. This report also contains other supplementary information in addition to the basic financial statements themselves.

Proprietary fund financial statements. The Authority's operations are accounted for as a single proprietary fund using the full accrual basis of accounting. In this regard, the Authority's operations are accounted for in a manner similar to a private-sector business.

for in a manner similar to a private-sector business.

The statements of net position present information on the Authority's assets and liabilities, with the difference between the two reported as net position. Over time, increases or decreases in net position may serve as a useful indicator of whether the financial position of the Authority is improving or deteriorating.

The statements of revenues, expenses, and changes in net position present information showing how the Authority's net position changed during the most recent fiscal year. All of the current year's revenues and expenses are recorded when the underlying transaction occurs, regardless of the timing of the related cash flows. For example, an electric bill for usage during the month of December 2023 is recorded as an expense in 2023 although it may not have been paid until January 2024.

The statements of cash flows differ from the statements of revenues, expenses, and changes in net position in that it accounts only for transactions that result in cash receipts and cash payments. Cash activities are separated into four distinct categories: 1) operating activities, 2) capital financing activities, 3) non-capital financing activities, and 4) investing activities. This statement assists users in assessing the Authority's ability to pay its bills and the effect on its finances of major transactions during the year.

Notes to financial statements. The notes provide additional information that is essential to a full understanding of the data provided in the financial statements such as the Authority's accounting methods and policies.

Analysis of Financial Position

2024:
The following condensed net position information shows that at December 31, 2024, total assets exceeded total liabilities by $7.5 million, an increase of $17,661 over the prior year.

	Net Position at December 31,		
	2024	2023	Change
Current assets	$ 760,092	$ 811,148	$ (51,056)
Capital assets - net	12,956,247	12,824,590	131,657
Total Assets	13,716,339	13,635,738	80,601
Current liabilities	864,657	441,717	422,940
Note payable - net	5,349,167	5,709,167	(360,000)
Total Liabilities	6,213,824	6,150,884	62,940
Invested in net assets net of related debt	6,900,280	6,768,623	131,657
Unrestricted	602,235	716,231	(113,996)

Net Position	$ 7,502,515	$ 7,484,854	$ 17,661

Total assets increased by $80,601, primarily due to a $131,657 rise in capital assets, reflecting continued investment in infrastructure and long-term equipment. This was partially offset by a $51,056 decrease in current assets.

Total liabilities increased by $58,940, driven by a $67,140 increase in current liabilities, related to higher short-term obligations and operating expenses.

The note payable, representing long-term debt, decreased $360,000 and is all in the current portion of long-term debt.

As a result of these changes, the organization's net position increased by $17,661.

2023:
The following condensed net position information shows that at December 31, 2023, total assets exceeded total liabilities by $7.5 million, an increase of $111,192 over the prior year.

	Net Position at December 31,		
	2023	2022	Change
Current assets	$ 811,148	$ 1,283,889	$(472,741)
Capital assets - net	12,824,590	12,637,378	187,212
Total Assets	13,635,738	13,921,267	(285,529)
Current liabilities	441,717	491,538	(49,821)
Note payable - net	5,709,167	6,056,067	(346,900)
Total Liabilities	6,150,884	6,547,605	(396,721)
Invested in net assets net of related debt	6,768,623	6,247,411	521,212
Unrestricted	716,231	1,126,251	(410,020)
Net Position	$ 7,484,854	$ 7,373,662	$ 111,192

A net decrease in cash, primarily the result of cash used in capital and related financing over cash provided by operating activities, was the driver in the decrease in Current Assets.

Additional investment in water system assets in excess of $500,000 was the principal reason for the increase of $187,000 in the net (after depreciation) value of Capital Assets.

A decrease in accounts and other payables resulted in a decrease of $49,821 in current liabilities.

The $347,000 decrease in Note Payable (net of current maturities) resulted from the scheduled principal payment and also, that there were no additional draws on the debt structure as a draw down loan.

Analysis of Operating Results

2024:

The following condensed information regarding revenues, expenses, and changes in net position provides a comparison of the major categories of revenues and expenses recognized during the year.

	Changes in Net Position		
	2024	2023	Change
Operating revenues	$ 1,888,388	$ 1,740,405	$ 147,983
Operating expenses	1,745,707	1,575,690	170,017
Operating income	142,681	164,715	(22,034)
Non-operating revenues and (expense)	(125,020)	(53,523)	(71,497)
Changes in net position	$ 17,661	$ 111,192	$(93,531)

Operating revenue increased 8.5% or $147,983, primarily as a result of an increase in metered water and fire service revenue.

Savings in many classes were more than offset by higher than expected water system maintenance and operating costs causing a 10.8% or $170,017 increase in total operating expenses.

Operating income decreased by $22,034 from $164,715 in 2023 to $142,681 in 2024.

Non-operating activities contributed a net expense of $125,020 in 2024, an increase of $71,497 compared to the prior year, attributable to increased interest expenses on the loan note and lower returns on investments.

The overall change in net position was a positive $17,661 in 2024, representing a decrease of $93,531 from the $111,192 recorded in 2023.

2023:

The following condensed information regarding revenues, expenses, and changes in net position provides a comparison of the major categories of revenues and expenses recognized during the year.

	Changes in Net Position		
	2023	2022	Change
Operating revenues	$ 1,740,405	$ 1,702,568	$ 37,837
Operating expenses	1,575,690	1,640,827	(65,137)
Operating income	164,715	61,471	102,974
Non-operating revenues and (expense)	(53,523)	839,237	(892,760)
Changes in net position	$ 111,192	$ 900,978	$(789,786)

Operating revenue increased 2.2% or $37,837 primarily as a result of an increase in metered water revenue.

Maintenance costs and costs for professional services were less than expected, resulting in a decrease of 4.0%, or $65,137, in operating expenses from 2022.

Non-operating (expense)/revenue was lower primarily as a result of less tap fees, and, most significantly, the substantial contribution of assets in 2022. The net effect was a decrease in net non-operating revenues by $892,760.

Water Rates

The Authority reviews water rates annually to manage revenues and ensure compliance with Bond Indentures. Water rates per 1,000 gallons of water used are as follow:

2024	$7.72
2023	$7.35
2022	$7.00
2021	$7.00
2020	$7.00

Capital Assets

At December 31, 2024, the Authority had invested $12.6 million in capital assets (wells, equipment, structures) and infrastructure (distribution and transmission waterlines) net of $8.2 million in accumulated

Capital Assets (continued)

depreciation. Significant additions included a capital investment in meters, tools, equipment, and infrastructure totaling $589,186.

At December 31, 2023, the Authority had invested $12.0 million in capital assets (wells, equipment, structures) and infrastructure (distribution and transmission waterlines) net of $7.7 million in accumulated depreciation. Significant additions included a capital investment in easements, meters, tools, equipment, and infrastructure totaling $626,000.

The Authority will continue to invest in improvements to its water system in 2025 at a significantly increased amount as compared with 2024. Budgeted capital improvements total $700,000 with that amount being primarily funded with monies available on hand and through the drawdown of the Water Revenue Note, Series of 2022.

Please refer to notes to the financial statements for additional information on the Authority's investment in capital assets and infrastructure.

Potentially Significant Matters

We are not aware of any other facts, decisions, or conditions that are expected to have a significant effect on the Authority's financial position or operating results.

Overall Financial Analysis

We believe that the overall financial position of the Authority has improved. The increase in net position is but one indication. In addition, the number of customers has increased over the prior year and this trend is expected to continue for the foreseeable future.

Request for Information

This financial report is designed to provide an overview of the Authority's finances. Questions concerning any of the information provided in this report or requests for additional financial information should be addressed to the Authority's Finance Director at 1481 East College Avenue, State College, PA 16801.

COLLEGE TOWNSHIP WATER AUTHORITY
STATEMENTS OF NET POSITION

	December 31, 2024	December 31, 2023
ASSETS		
Current Assets:		
Cash	$ 357,034	$ 400,681
Accounts receivable, net	375,074	384,264
Material and supplies	27,984	26,203
Total current assets	760,092	811,148
Capital Assets:		
Water Utility Plant in service, at cost	19,970,998	19,740,392
Less accumulated depreciation	(8,158,285)	(7,700,756)
Net utility plant	11,812,713	12,039,636
Construction in progress	1,143,534	784,954
Total utility plant	12,956,247	12,824,590
Total assets	13,716,339	13,635,738
LIABILITIES		
Current Liabilities:		
Accounts payable and accrued expenses	84,433	80,146
Accrued interest	73,424	--
Due to College Township	--	14,771
Current portion of note payable	706,800	346,800
Total current liabilities	864,657	441,717
Non-current Liabilities:		
Note payable, net	5,349,167	5,709,167
Total liabilities	6,213,824	6,150,884
NET POSITION:		
Invested in capital assets, net of related debt	6,900,280	6,768,623
Unrestricted	602,235	716,231
Total net position	$ 7,502,515	$ 7,484,854

See accompanying notes to financial statements

COLLEGE TOWNSHIP WATER AUTHORITY
STATEMENTS OF REVENUES, EXPENSES AND CHANGES IN NET POSITION

	Year Ended December 31, 2024	Year Ended December 31, 2023
Operating revenues (securing note):		
Water operating revenues	$ 1,549,371	$ 1,406,013
Unmetered water sales and other fees	339,017	334,392
Total operating revenues	1,888,388	1,740,405
Operating expenses:		
Purification system	44,348	56,338
Pumping system, primarily power	85,613	104,680
Maintenance	105,300	49,256
General	384,097	314,195
Office	113,717	111,952
General property	41,275	40,645
Engineering and professional fees	76,325	72,366
Taxes, benefits and insurance	309,898	260,480
Other	127,605	126,736
Depreciation and amortization	457,529	439,042
Total operating expenses	1,745,707	1,575,690
Operating income	142,681	164,715
Non-operating (expense)/revenue:		
Interest expense	(146,547)	(151,412)
Investment income	11,399	32,255
Gain on disposal of asset	--	27,000
Tap and connection fees	10,128	38,634
Total non-operating (expenses)/revenues	(125,020)	(53,523)
Net income	17,661	111,192
Net position, beginning	7,484,854	7,373,662
Net position, ending	$ 7,502,515	$ 7,484,854

See accompanying notes to financial statements

COLLEGE TOWNSHIP WATER AUTHORITY
STATEMENTS OF CASH FLOWS

	Year Ended December 31, 2024	Year Ended December 31, 2023
Cash flow from operating activities:		
Cash received from customers	$ 1,907,706	$ 1,773,338
Cash payments to suppliers for goods and services	(1,300,443)	(1,194,424)
Net cash provided by operating activities	607,263	578,914
Cash flows from capital and related financing activities:		
Payments for water utility plant	(589,186)	(626,254)
Interest paid on note payable	(73,123)	(151,412)
Interest received	11,399	32,255
Principal paid on note payable	--	(334,000)
Proceeds from sale of equipment	--	27,000
Net cash used in capital and related financing activities	(650,910)	(1,052,411)
Net decrease in cash	(43,647)	(473,497)
Cash balance, beginning of year	400,681	874,178
Cash balance, end of year	$ 357,034	$ 400,681
Reconciliation of operating income to net cash provided by operating activities:		
Operating Income	$ 142,681	$ 164,715
Tap and connection fees	10,128	38,634
Adjustment to reconcile operating income to net cash provided by operating activities:		
Depreciation of water utility plant	457,529	439,042
Change in assets and liabilities:		
Decrease/(increase) in receivables	9,190	(5,701)
(Increase)/decrease in materials and supplies	(1,781)	4,945
Increase/(decrease) in accounts payable and accrued expenses	4,287	(64,515)
(Decrease)/increase in amounts due to related parties	(14,771)	1,794
Net cash provided by operating activities	$ 607,263	$ 578,914

See accompanying notes to financial statements

NOTES TO BASIC FINANCIAL STATEMENTS

TABLE OF CONTENTS

		PAGE
A.	Summary of Significant Accounting Policies	13-15
B.	Deposits and Investments	16-17
C.	Accounts Receivables, net	17
D.	Water Utility Plant	18
E.	Notes Payable	18-20
F.	Statement of Cash Flows	21
G.	Risk Management	21
H.	Related Party Transactions	21
I.	Commitments and Contingencies	21
J.	Subsequent Events	21

A. Summary of Significant Accounting Policies

The College Township Water Authority (the "Authority") was formed by resolution of the Council of the Township of College, Centre County, Pennsylvania adopted on May 2, 1996 pursuant to the Pennsylvania Municipality Authorities Act of 1945.

Effective as of May 20, 1996, the Authority acquired a majority of the voting rights of the common stock of Lemont Water Co. which has since been liquidated.

Reporting Entity - College Township Council appoints all five members of the Authority's board. Council has no further involvement in the affairs of the Authority, no responsibility for its debt and provides no substantial financial operating assistance. The Authority is a separate entity and sets its own rates, adopts its budget and issues debt without the approval of the Township. The Authority is not a component unit of College Township.

Description of Business - The Authority supplies water to residential and business customers in College Township, Pennsylvania. All of the Authority's activities are located in Central Pennsylvania. Water produced is treated with a sequesterant and is disinfected with chlorine. The wells provide water to the customers through 54.2 miles of underground distribution piping.

The Spring Creek Well and the Rogers Well are the two sources for the water system. The Spring Creek Park Well has a permitted capacity of 1,700 gpm and is limited to a monthly average withdrawal of 1.80 mgd. The Roger Well has a permitted capacity of 2,890 gpm and is limited to a monthly average withdrawal of 1.80 mgd.

Oak Hall Well OH-19 has been added as a seasonal source serving the Oak Hall Regional Park located in the southeastern part of the distribution system. The well is permitted as a Transient Non-Community System with a permitted capacity of 50 gpm. The well facility is drained and taken out of service between the months of October and April.

Measurement Focus and Basis of Accounting - The Authority accounts for its activities as an Enterprise Fund that is similar to those found in the private sector, where the determination of net income is necessary or useful to sound financial administration. The Authority's financial statements are reported using the economic resources measurement focus and the accrual basis of accounting.

Revenue is generally recognized from water sales when the meters are read. Meters are read on a quarterly basis for regular customers. Rates are determined based on a fee schedule approved by the Authority's Board. Un-billed receivables are recorded as revenues based upon pro-rata calculations, from the date of the last meter reading to the financial reporting date.

A. Summary of Significant Accounting Policies (continued)

Expenses are recorded when a liability is incurred, regardless of the timing of related cash flow.

Water utility plant - All additions to the water utility plant are recorded at cost when an asset is placed in service. Costs incurred during the construction of an asset are accumulated and reported as construction in progress until the asset is placed in service.

Maintenance and repairs are charged to operations when incurred. Betterments and renewals are capitalized. When property and equipment are sold or otherwise disposed, the asset account and related depreciation account are reduced and any gain or loss is included in operations.

Depreciation - Assets are depreciated over estimated useful lives using the straight-line method.

Accounts receivable - Accounts receivable are shown net of allowances for uncollectible amounts.

Inventory - Inventories of supplies and materials are stated at the lower of cost or market value based on the first-in, first-out method.

Interest Expense - Interest costs incurred on loans are capitalized as part of the cost of the constructed project. Interest costs on borrowings for construction are capitalized as work progresses until completion of the project.

Income Tax Expense - The Authority is exempt from federal and state income tax under the Municipality Authorities Act of 1945.

Contributions in Aid of Construction - The Authority receives property additions from developers and customers to extend its service territory. These are typically constructed by the third party contractors with the Authority's supervision. Contributed assets are then depreciated over their useful life.

Cash and Cash Equivalents - For the purpose of the statement of cash flows, the Authority considers as cash 1)checking and demand accounts at banks, 2) Certificates of Deposit, and 3) Short-term Investments invested with the Pennsylvania Local Government Trust (PLGIT).

Net Position - The Authority maintains the following net position classifications:

Net investment in capital assets: Capital assets, net accumulated depreciation and outstanding debt attributable to the acquisition, construction, repair or improvement of those assets.

A. Summary of Significant Accounting Policies (continued)

Restricted: A portion of net position subject to externally imposed conditions by parties outside of the Authority (such as creditors, grantors, laws, regulations or other governments). There was no restricted net position at December 31, 2024 and 2023.

Unrestricted: All other categories of net position. These assets may be designated for specific purposes.

Estimates - The preparation of financial statements in accordance with generally accepted accounting principles requires the use of estimates by management. Actual results may differ.

B. Deposits and Investments

Pennsylvania statutes provide for investment of governmental funds into certain authorized investment types including U.S. Treasury bills, other short-term U.S. and Pennsylvania government obligations and insured or collateralized time deposits and certificates of deposit. The statutes do not prescribe regulations related to demand deposits; however, they do allow the pooling of governmental funds for investment purposes.

The following is a description of the Authority's deposit and investment risks:

Custodial Credit Risk - Deposits Custodial credit risk is the risk that in the event of a bank failure, the government's deposits may not be returned to it. The Commonwealth of Pennsylvania recognizes this risk. Under its Act 72, deposits of public funds (in excess of $250,000 of FDIC insurance) held by banks must be collateralized. Banks must place on deposit with a third-party (usually a Federal Reserve Bank) securities with an aggregate market value in excess of all of its uninsured balances. The Authority requires this protection for its funds.

The Pennsylvania Local Government Investment Trust (PLGIT):

The Authority invests funds with PLGIT. PLGIT was created in 1981 to meet the short-term investment needs of local governments, school districts, municipal authorities, and other types of governments in the Commonwealth of Pennsylvania and currently serves more than 3,200 public entity investors across the Commonwealth and cooperatively invest more than $10.5 billion across multiple programs. PLGIT is subjected to an annual audit. Additional information on PLGIT and its investment strategies can be found at www.plgit.com.

B. **Deposits and Investments (continued)**

The Authority utilizes these PLGIT investment options:

PLGIT is a professionally managed portfolio of the Trust that operates like a money market fund and stresses safety of principal as its primary objective - a fact underscored by its AAAm Rating from Standard & Poor's. This is a flexible option that requires no minimum balance, no minimum initial investment, and a one day minimum investment period. Dividends are paid monthly.

PLGIT-Prime is a variable rate investment portfolio rated AAAm by Standard & Poor's. This web-based option requires no minimum balance and no minimum initial investment. This option limits redemptions or exchanges to two per calendar month.

PLGIT-Term is a fixed term investment portfolio of the Trust with maturity of up to one year. This option requires a minimum initial investments of $100,000, a minimum investment period of sixty (60) days, and has a premature withdrawal penalty.

PLGIT-CD Purchase Program is an option that enables Investors to purchase directly Certificates of Deposit ("CDs") which are intended to be fully insured by the Federal Deposit Insurance Corporation ("FDIC"). Investments in the PLGIT-CD Purchase Program are direct investments of the Investor, not assets of the Trust or under control of its Board of Trustees.

As of December 31, 2024, the Authority's deposit accounts were insured and collateralized as follows:

	Bank Balance	Book Balance
Bank deposits - Insured	$ 159,290	$ 142,368
Uninsured and uncollateralized:		
PLGIT - Class portfolio	152,354	152,354
PLGIT - Term portfolio	62,162	62,162
Total investments held by PLGIT	214,516	214,516
Petty Cash	150	150
Total Cash	$ 373,956	$ 357,034

B. **Deposits and Investments (continued)**

As of December 31, 2023, the Authority's deposit accounts were insured and collateralized as follows:

	Bank Balance	Book Balance
Bank deposits - Insured	$ 250,000	$ 196,027
Certificates of Deposit - Insured	200,000	201,933
Bank deposits - Collateralized	362,281	--
Total deposits held by banks	812,281	397,960
Uninsured and uncollateralized:		
PLGIT - Class portfolio	1,370	1,370
PLGIT - Term portfolio	1,201	1,201
Total investments held by PLGIT	2,571	2,571
Petty Cash	150	150
Total Cash	$ 815,002	$ 400,681

C. **Accounts Receivables, net**

Accounts receivable (billed and unbilled) aggregated $375,074 and $384,264 net of allowances of $8,157 and $8,035 as of December 31, 2024 and 2023, respectively. Unbilled accounts receivable were $235,567 and $205,467 as of December 31, 2024 and 2023, repsectively.

D. Water Utility Plant

Water utility plant is made up of contributed property and purchased or constructed property as follows:

	Useful Life In Years	December 31, 2024	December 31, 2023
Land and rights		$ 228,140	$ 228,140
Land improvements	15	11,468	11,468
Land, rights and improvements		239,608	239,608
Structures and Improvements:			
Distribution reservoirs, tanks and standpipes	20-60	470,458	435,395
Power and pumping structures	20-35	665,124	665,124
Wells and springs	40	4,357,104	4,357,104
Structures and improvements		5,492,686	5,457,623
Tangible Plant:			
Main and accessories	50	12,779,798	12,677,899
Meters	10-20	730,891	702,227
Electric pumping equipment	10-20	125,632	125,632
Transportation equipment	5-7	327,397	327,397
Tools and work equipment	15	166,784	101,804
Office furniture and equipment	3-7	75,195	75,195
Other power pumping equipment	10	33,007	33,007
Tangible plant		14,238,704	14,043,161
Total		19,970,998	19,740,392
Less accumulated depreciation		(8,158,285)	(7,700,756)
Net Water Utility Plant		$ 11,812,713	$ 12,039,636

E. Notes Payable

Notes payable for the year were as follows:

	Beginning Balance	Reductions	Ending Balance
Water Revenue Note, Series of 2015	$ 4,021,700	$ --	$ 4,021,700
Water Revenue Note, Series of 2022	2,034,267	--	2,034,267
	$ 6,055,967	$ --	$ 6,055,967

E. Notes Payable (continued)

On December 8, 2015, the Authority entered into a loan agreement with CNB Bank for $10,000,000 for its Water Revenue Note, Series of 2015. The net proceeds of $7,598,471 at settlement (after payment of $65,957 in origination fees, legal fees and other issuance costs) were used to advance-refund the outstanding Water Revenue Bonds, Series of 2010 and the related accrued interest. The Authority could then draw an additional $2,335,572 on the Note to fund the acquisition or construction of additions, alterations and improvements to the existing water system. The Note bears interest at 1.98% for the first sixty months, then a variable rate equal to the tax free equivalent of the five year Federal Home Loan Advance Rate ("FHLB") rate plus 1.24% subject to a maximum rate of 2.98% for months 61-120, 3.68% for months 121-180 and 4.18% for months 181-240. In accordance with the loan agreement the Note's interest rate reset to 1.469% in December 2021. The Note is secured by all receipts and revenues of the water system. In May 2022 the Authority made a final draw on the Note to reach the cap of $10,000,000.

On December 6, 2022, the Authority entered into a loan agreement with Jersey Shore State Bank for $5,295,500 for its Water Revenue Note, Series of 2022. The net proceeds of $1,981,292 (after payment of $52,975 in origination fees, legal fees and other issuance costs) were used to pay-down principal of $1,968,800 and accrued interest of $12,692 on the Authority's Water Revenue Note, Series of 2015. The Authority can then draw an additional $3,225,233 on the Note to fund the acquisition or construction of additions, alterations and improvements to the existing water system. The Note bears interest at a rate equal to 4.25% for the first 120 months ending January 2033. Thereafter, the interest rate will be reset on the first day of the month for the remainder of the term at a rate equal to 79% of the Wall Street Journal Prime Rate (or its equivalent), not to exceed 5.0%.

Annual payments of principal commence on January 1, 2026 in amounts set forth in the loan document. The Note is secured by all receipts and revenues of the water system.

E. Notes Payable (continued)

Total annual future debt payments on the Water Revenue Note, Series of 2015 are as follows:

	Principal	Interest	Total Debt Service
2025	$ 701,800	$ 54,734	$ 756,534
2026	363,500	123,869	487,369
2027	376,800	110,307	487,107
2028	390,700	96,511	487,211
2029	404,900	81,670	486,570
2030	422,600	66,563	489,163
2031	431,300	57,697	488,997
2032	449,200	39,526	488,726
2033	419,900	20,381	440,281
2034	61,000	2,585	63,585
	$ 4,021,700	$ 653,843	$ 4,675,543

Total annual future debt payments on the Water Revenue Note, Series of 2022 are as follows:

	Principal	Interest	Total Debt Service
2025	$ 5,000	$ 223,529	$ 228,529
2026	6,000	223,316	229,316
2027	6,000	223,061	229,061
2028	6,000	222,806	228,806
2029	7,000	222,551	229,551
2030	5,000	222,254	227,254
2031	5,000	222,041	227,041
2032	6,000	221,829	227,829
2033	16,000	260,675	276,675
2034	393,000	259,875	652,875
2035	476,000	240,225	716,225
2036	500,000	216,425	716,425
2037	525,000	191,425	716,425
2038	551,000	165,175	716,175
2039	579,000	137,625	716,625
2040	608,000	108,675	716,675
2041	638,000	78,275	716,275
2042	670,000	46,375	716,375
2043	257,500	12,875	270,375
	$ 5,259,500	$ 3,499,012	$ 8,758,512

F. Statement of Cash Flows

For the years ending December 31, 2024 and 2023, the Authority paid interest of $73,123 and $151,412, respectively.

G. Risk Management

The Authority is exposed to various risks of loss related to liability; theft of, damage to, and destruction of property and other assets; and errors and omissions for which the Authority carries commercial insurance. Settle claims from these risks have not exceeds commercial insurance coverage for the past two years.

H. Related Party Transactions

During 2024 and 2023 the Authority paid College Township $124,704 and $119,280, respectively, for the oversight of its administrative, financial and operational activities. College Township also serves as the common paymaster for all employees. Costs of the employees hired for, or assigned to Authority operations are billed at actual costs and reimbursed by the Authority.

I. Commitments and Contingencies

The Authority is negotiating an agreement with the Pennsylvania State University, whereby it can purchase up to one million gallons of water per day on an emergency basis.

J. Subsequent Events

Subsequent events have been evaluated through July 7, 2025, which is the date the financial statements were available to be issued.

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COLLEGE TOWNSHIP WATER AUTHORITY
SCHEDULE OF REVENUES, EXPENSES AND DEBT SERVICE-
BUDGET VS. ACTUAL
YEAR ENDED DECEMBER 31, 2024

	Actual	Budget-Unaudited-Cash Basis	Variance
Water System Operating Revenues	$ 1,549,371	$ 1,598,627	$(49,256)
Unmetered Water Sales & Other	339,017	337,848	1,169
	1,888,388	1,936,475	(48,087)
Operating Expenses:			
Purification system	44,348	55,000	10,652
Pumping system, primarily power	85,613	117,370	31,757
Maintenance	105,300	70,952	(34,348)
General	384,097	356,876	(27,221)
Office	113,717	119,325	5,608
General property	41,275	41,100	(175)
Engineering and professional fees	76,325	91,950	15,625
Taxes, benefits and insurance	309,898	322,166	12,268
Other	127,605	127,804	199
Total operating expenses	1,288,178	1,302,543	14,365
Net operating income	600,210	633,932	(33,722)
Other Receipts and Revenues:			
Interest Income	11,399	24,000	(12,601)
Tap and Connections	10,128	50,000	(39,872)
Total non-operating revenues	21,527	74,000	(52,473)
Total available for debt service	621,737	707,932	(86,195)
Debt service requirement	(146,547)	(630,392)	483,845
Available for contingencies and capital improvements	$ 475,190	$ 77,540	$ 397,650
Ratio of total available for debt service to debt service	424.3%	112.3%	

Note: Depreciation, amortization, contributions of capital assets and items of accretion are omitted from this presentation.

INDEPENDENT AUDITORS' REPORT ON INTERNAL CONTROL OVER FINANCIAL REPORTING AND ON COMPLIANCE AND OTHER MATTERS BASED ON AN AUDIT OF FINANCIAL STATEMENTS PERFORMED IN ACCORDANCE WITH GOVERNMENT AUDITING STANDARDS

Members of the Authority
College Township Water Authority
1481 East College Avenue
State College, PA 16801

We have, in accordance with auditing standards generally accepted in the United States of America and the standards applicable to financial audits contained in *Government Auditing Standards*, audited the financial statements of College Township Water Authority issued by the Comptroller General of the United States, the financial statements of College Township Water Authority which comprise the statement of net position as of December 31, 2024, and the related statements of revenues, expenses, and changes in net position and cash flows for the year then ended, and the related notes to the financial statements, and have issued our report thereon dated July 7, 2025.

Report on Internal Control Over Financial Reporting

In planning and performing our audit of the financial statements, we considered College Township Water Authority's internal control over financial reporting (internal control) as a basis for designing audit procedures that are appropriate in the circumstances for the purpose of expressing our opinion on the financial statements, but not for the purpose of expressing an opinion on the effectiveness of College Township Water Authority's internal control. Accordingly, we do not express an opinion on the effectiveness of College Township Water Authority's internal control.

A *deficiency in internal control* exists when the design or operation of a control does not allow management or employees, in the normal course of performing their assigned functions, to prevent, or detect and correct misstatements, on a timely basis. A *material weakness* is a deficiency, or a combination of deficiencies, in internal control, such that there is a reasonable possibility that a material misstatement of the entity's financial statements will not be prevented, or detected and corrected, on a timely basis.

A *significant deficiency* is a deficiency, or a combination of deficiencies, in internal control that is less severe than a material weakness, yet important enough to merit attention by those charged with governance.

Our consideration of internal control was for the limited purpose described in the first paragraph of this section and was not designed to identify all deficiencies in internal control that might be material weaknesses or significant deficiencies. Given these limitations, during our audit we did not identify any deficiencies in internal control that we consider to be material weaknesses. However, material weaknesses may exist that have not been identified.

Report on Compliance and Other Matters

As part of obtaining reasonable assurance about whether College Township Water Authority's financial statements are free of material misstatement, we performed tests of its compliance with certain provisions of laws, regulations, contracts, and grant agreements, noncompliance with which could have a direct and material effect on the financial statement. However, providing an opinion on compliance with those provisions was not an objective of our audit, and accordingly, we do not express such an opinion. The results of our tests disclosed no instances of noncompliance or other matters that are required to be reported under *Government Auditing Standards*.

Purpose of this Report

The purpose of this report is solely to describe the scope of our testing of internal control and compliance and the results of that testing, and not to provide an opinion on the effectiveness of the entity's internal control or on compliance. This report is an integral part of an audit performed in accordance with *Government Auditing Standards* in considering the College Township Water Authority's internal control and compliance. Accordingly, this communication is not suitable for any other purpose.

State College, Pennsylvania
July 7, 2025

201 Penn Street | Suite 300 | P.O. Box 32 | Reading, PA 19603

College Township Water Authority

Engineer's Report – August 6, 2025 Board Meeting

The following is Entech Engineering's Monthly Report for August:

1. The Construction Permit for the Oak Hall Well was issued by PADEP on June 12th. Entech will complete the final design of the facility this fall with the intent to bid the work at the end of the year.

2. We met with the Engineering Committee and Staff on July 9th to initiate the 2020 Capital Improvement Plan Update.

3. We met with the Engineering Committee, Staff and TriStar on July 15th to review the pending Oak Hall Well Project and other SCADA system needs.

4. The First Avenue Waterline Replacement Project is Substantially Completed. A walk-through was performed on June 26th. It was agreed to replace the Stuble Road storm drain with an elliptical pipe to improve the cover over this new drain line.