

Climate Resilience in Carlisle and Cumberland County: Social Equity and Governance

By Kathryn Hickey
Dickinson College

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1. Introduction

As climate change intensifies, we must know where we are vulnerable to climate hazards to prevent damage and human harm. A significant part of climate resilience is how we plan to deal with climate hazards. This could be specific government or municipal plans, organizations that help vulnerable populations, or emergency service management. This report will go through planning processes that address climate change and climate resilience, community engagement in creating these plans and organizations that promote resilience, communication and public education about these plans and organizations, and equity in terms of who is most vulnerable to climate hazards and the resources available to them. This report will also go through processes for planning and community engagement that do not explicitly address climate hazards but can help to reduce vulnerabilities to climate hazards and provide capacities for building resilience.

It should be noted that Pennsylvania’s government works differently than other states since we are a commonwealth. The power or authority lies within each individual municipality, not in the county. Thus, there are initiatives that the County can suggest a municipality implement, but the municipality is not required to do so, unless the State of Pennsylvania or the US federal government makes it a requirement. The Cumberland County Planning Department works with all 33 municipalities in Cumberland County, but since the power is in

the municipality, it can be difficult to figure out how consistent they are (K. Stoner). It is also difficult to get cross-municipality coordination (M. Silverstrim, K. Stoner, & J. Jumper).

2. Planning Processes

There are various planning processes in the county and in local municipalities in the county that directly or indirectly address climate-related hazards and/or climate resilience. These plans include local comprehensive plans, hazard mitigation plans, climate action plans, emergency operation plans, stormwater management plans, and strategic plans. There are also ordinances, regulatory activities, and partnerships/organizations that are used in to implement these plans, such as building codes, floodplain ordinances/the National Flood Insurance Program, subdivision and land development ordinances, zoning ordinances, the South Central Task Force, and the Cumberland County Planning Department.

2.1. Comprehensive Plans

The Cumberland County Comprehensive Plan sets up goals for the county to develop in an orderly manner (CCPC & CCPD, 2017). This does not specifically focus on climate change currently but does address planning areas that can impact climate risks and resilience, such as land use, housing, economic development, and natural resource protection. This plan is a guide for the municipalities in the county to use; however, the county has no legal authority to enforce the municipalities to follow this plan since it is not federally required (K. Stoner). The Cumberland County Planning Department is currently updating and writing a new edition of the County Comprehensive Plan. This new plan will be centered around eight principles, called the Cumberland Principles, and one of these will be to foster resilient and safe communities, which will focus on climate change resilience (K. Stoner; Cumberland Planning Principles and Key Tenets, 2023).

Local comprehensive plans suggest ways to enhance the physical design and development of the local municipality. These plans are implemented through zoning ordinances, subdivision regulations, and capital improvement programs. Hazard mitigation is integrated into the comprehensive plan so that future development does not increase vulnerability to climate hazards (Cumberland County Planning Department & Cumberland County Department of Public Safety, 2020). Looking more specifically at the Carlisle Comprehensive Plan, it takes on an issue-based approach to renew the vision and strategies for sustaining the quality of community development and life in Carlisle. This includes land use, transportation, housing, community services and utilities, natural resources, and historic resources. It also provides the foundation for major regulatory changes and infrastructure investments.

The Plan included resident and stakeholder participation through the Stakeholder Leadership Team and an online survey. Based on this survey, the Stakeholder Leadership Team, and the Borough Council, six planning issues were prioritized for better outcomes by 2025, which were Downtown, Traffic and Parking, Public Safety, Housing and Shelter, Bicycle and Pedestrian Mobility, and Resiliency. The Resiliency planning issue focuses on improving local capabilities to anticipate, prepare for, limit damages from, recover from, learn from, and transform in response to significant natural, social, and economic disturbances and changes. Some disturbances could be, for example, natural hazards, health conditions, financial stresses, interruptions in utility and transportation services, and civil disturbances. Increasing resiliency against these disturbances can include learning from past events through analyzing the risk, impact, and response to disturbance, changing community policies, programs, and services to restore individual/family life and building/rebuilding property, and strengthening collective capacity to mobilize people, supplies, and equipment to minimize future impacts (Carlisle Borough Council, 2019).

2.2. Hazard Mitigation Plan

Another plan that the County has in place is the Hazard Mitigation Plan. This plan identifies natural and man-made hazards facing Cumberland County and suggests strategies to address them to reduce damage and save lives (K. Stoner; Cumberland County Planning Department & Cumberland County Department of Public Safety 2020). The Hazard Mitigation Plan is a required plan by the state, thus every county and all its municipalities in Pennsylvania must have one. Having the Hazard Mitigation Plan enables municipalities to receive federal funding to recover from incidents, make repairs, and mitigate future instances of the same hazard. The State Hazard Mitigation Officer and the State Hazard Mitigation Planner provide information about hazards to and work directly with county partners and state agencies to implement plans in each county (J. Jumper).

For instance, the Hazard Mitigation Plan recommended that all municipalities know where their floodplains are. Thus, all floodplain maps were updated and all of the municipalities in Cumberland County have adopted them and are thus eligible for the National Flood Insurance Program. Municipalities also have to limit development in those floodplain areas to avoid loss of life and property (K. Stoner & J. Jumper). However, the process to get these funds is complex and takes a while and not all municipalities have the resources to do that (K. Stoner). The Cumberland County Hazard Mitigation Plan explicitly addresses climate change, and states that climate change represents a significant threat to the county. Rather than listing climate change as a specific hazard in this plan, the impacts of climate change for specific hazards were included in the corresponding future occurrence sections. Identified hazards such as droughts, floods, hurricanes, tropical storms, and nor'easters, and power failures can increase in frequency and/or intensity due to climate change.

This plan also indicated that the County joined the PA Department of Environmental Protection's Climate Action Plan Program in July 2020. Through this program, the County developed a greenhouse gas inventory with the help of Dickinson College and Shippensburg University. From this, the County created a climate change task force to develop the County Climate Action Plan, which will be discussed later in this report. The Cumberland County Hazard Mitigation Plan was drafted by the Cumberland County Hazard Mitigation Steering Committee, which includes government leaders and elected officials from the county (Cumberland County Planning Department & Cumberland County Department of Public Safety 2020).

2.3. Climate Action Plans

The County Climate Action Plan was specifically created because climate change wasn't clearly addressed in any other county plans up to that point (K. Stoner). This action plan describes the impact of climate change in Cumberland County and provides strategies for residents and businesses to reduce greenhouse gas emissions from transportation, land use, waste management, and energy production and consumption (Cumberland County, 2022). The team that developed this county plan included a project steering committee with representatives from Cumberland County Planning Department, Cumberland Area Economic Development Corporation, Cumberland County Conservation District, Dickinson College, and Shippensburg University and a resident advisory group made up of volunteers (Cumberland County, 2022). As mentioned previously, in Pennsylvania, authority lies within the municipality, not the county. This plan is a county plan and municipalities have the option to adopt and modify the plan for their respective municipality. The Cumberland County Planning Department and the local Climate Assistance Program at the Department of Environmental Protection will help them in this if they choose to do so, but they cannot enforce every

municipality to adopt the Climate Action Plan. As of right now, only four municipalities have developed their own climate action plans (K. Stoner).”

At the local level, the Carlisle Climate Action Plan is a framework for action that aims to reduce greenhouse gas emissions of 2005 levels by 26% by 2025 and 80% by 2050 through coordinating efforts from local government and community-wide activities within the Carlisle Borough. The Carlisle Borough Council identified several methods to reduce greenhouse gas emissions and promote climate resilience from Pennsylvania’s Climate Action Plan from September 2021, including some plans and procedures that should be improved and/or implemented. Some of these plans include implementing sustainable transportation planning and practices, improving reliability and accessibility of public information about climate-related health risks, bolstering emergency preparedness and response, leading by example in local government practices and assets, and incorporating historical and projected climate conditions into siting and design decisions for long-term infrastructure (Carlisle Borough Council, 2022).

2.4. Emergency Operation Plan (EOP)

The Cumberland County Emergency Operations Plan (EOP) explains how the Cumberland County Government implements emergency management and serves as a connection between the municipal emergency management agencies and PEMA. Within the EOP, there is the “Basic Plan” section, which presents the policies and plans for how to assist municipalities in the face of an emergency. It also summarizes planning assumptions, mitigation, preparedness, response and recovery actions, responsibilities, and other procedures. There is a sub-section on Emergency Support Function (ESF) Organization and Responsibilities, which lists what each working part of the EOP is responsible for. These responsibilities are broken down into the Prevention and Preparedness Phases and the Response and Recovery Phases, the former focusing on actions to take prior to an emergency, thus promoting community and climate resilience. The next section, the “Emergency Support Function Annexes”, describes the mission and responsibilities of coordinating, categorized by the National Incident Management System. This includes communication, mass care, shelter, and human services, resource support, public health and medical services, and long-term community recovery and mitigation. The long-term community recovery and mitigation involves protecting and restoring human services, infrastructure, and business environment in the disaster areas, thus responding to climate hazards. The last section, “Incident (or Hazard) Specific Annexes”, outlines how to respond to specific emergencies or hazards (EOC, 2019).

Each municipality has a designated local emergency management coordinator who knows the impact potential hazard events have on their community. All municipalities are required to have a Local Emergency Operations Plan (EOP), which must be updated every two years. Cumberland County has an EOP as well as a Continuity of Operations Plan. No municipality have a Continuity of Operations Plan. Carlisle Borough, Southern Middleton Township, and North Middleton Township are the only municipalities with Disaster Recovery Plans (Cumberland County Planning Department & Cumberland County Department of Public Safety, 2020).

2.5. Stormwater Management Plans

There is a county-wide Stormwater Management Plan and each municipality has its own Stormwater Management Plan (K. Stoner). The county-wide plan identifies land features, land use, and hydrologic

characteristics of the county, including existing runoff characteristics, existing and proposed stormwater collection systems, stormwater problem areas, and watershed descriptions. There's also a technical analysis that evaluates present and future impacts on storm runoff and assesses alternative runoff control methods. Lastly, there is a section that goes over stormwater management ordinance and regulations for different municipalities within the county (Skelly and Loy, INC., 2010).

2.6. Carlisle Strategic Plan

The Carlisle Strategic Plan was designed to bridge the gap between short-term goals and long-term visions and to ensure that our community is put first in our policies and operations. It's a framework with six strategic outcome areas: Caring and Professional, Vibrant and Thriving, Dynamic and Responsible, Healthy and Sustainable, Welcoming and Livable, and Accessible and Connected. The Healthy and Sustainable outcome area is particularly relevant to climate resilience since it focuses on building a healthy community that is socially and environmentally sustainable in terms of maintaining quality of life, protecting ecosystems, and conserving natural resources. The Vibrant and Thriving Outcome Area also relates to climate resilience in the sense of increasing community engagement from diverse peoples. Input from the community was actively sought through three in-person community input sessions, online surveys, mailed surveys, surveys available at local community centers, handing out surveys at downtown events, mass emails, social media posts, and local news coverage (Carlisle Borough Council, 2023).

2.7. Implementing Plans

There are various ways to implement the various plans discussed. This includes different codes, ordinances, and organizations and departments focused on planning processes.

One such code is building codes. Building codes regulate new construction and renovation standards, which can require (or prevent) resilient building design practices to address potential hazards. The Commonwealth of Pennsylvania implemented the Uniform Construction Code (UCC), which is a comprehensive building code that establishes minimum standards for new construction. All 33 municipalities in Cumberland County have adopted this and are thus required to enforce these regulations for all building permits submitted after October 1st, 2018 (Cumberland County Planning Department & Cumberland County Department of Public Safety, 2020).

One ordinance in place is floodplain ordinances. Floodplain ordinances ensure that new construction is flood-proofed, dry-proofed, or built above anticipated flood elevations or that improvements are made to existing buildings to abide by this too. The National Flood Insurance Program (NFIP) establishes minimum ordinance requirements that a community must meet in order to be a part of their program. Every municipality in the county has a floodplain ordinance in place since they are a part of NFIP (Cumberland County Planning Department & Cumberland County Department of Public Safety, 2020). For instance, the Hazard Mitigation Plan recommended that all municipalities know where their floodplains are. Thus, all floodplain maps were updated and all of the municipalities in Cumberland County have adopted them and are thus eligible for the National Flood Insurance Program. Municipalities also have to limit development in those floodplain areas to avoid loss of life and property (K. Stoner & J. Jumper).

Another ordinance is subdivision and land development ordinances. These ordinances regulate the development of housing, commercial, industrial, and public infrastructure. By regulating how land is divided and what it can be used for, the exposure of development to hazard events is reduced, including reducing climate risks. All municipalities in Cumberland County have adopted a subdivision and land development ordinance (Cumberland County Planning Department & Cumberland County Department of Public Safety, 2020).

Another ordinance is zoning ordinances. These regulate the use of land in order to protect the interest and safety of the public. They can be designed to address specific concerns in a given community. All but three municipalities in Cumberland County have adopted a zoning ordinance (Cumberland County Planning Department & Cumberland County Department of Public Safety, 2020).

The South Central Task Force is an organization that plays a role in the County Hazard Mitigation Plan by coordinating how to share resources across counties to respond to emergencies when the individual counties impacted by the emergency need extra assistance before the state can officially assist. More specifically, the South Central Task Force sets up relationships across eight counties in Pennsylvania to designate and share resources in times of crisis due to a natural disaster to increase resilience (M. Silverstrim; Cumberland County Planning Department & Cumberland County Department of Public Safety, 2020; Pennsylvania Criminal Intelligence Center et al., 2017). This mutual aid encourages continual communication and collaboration between counties; however, it is only for natural disasters and terrorism, not general climate resilience (M. Silverstrim).

As mentioned previously, the Cumberland County Planning Department develops county-wide plans as a guide for municipalities. The Cumberland County Planning Department will work with municipalities individually to develop plans that the individual municipality wants to implement. It should be noted that the Cumberland County Planning Department integrates climate change into several of their plans, however, climate change is not the center of everything they do in the planning office (Kirk Stoner). Also, staffing and resources vary across the county. In general, municipalities west of Carlisle in Cumberland County are typically more rural and have limited staff who focus on basic services for residents and thus are not working on plans that address climate change. In contrast, municipalities east of Carlisle (including Carlisle) are more urban and have more staff, which enables them to work on plans that address climate change (K. Stoner).

2.8. Planning Coordination

There is some coordination across planning processes and partnerships. This coordination can vary in scope. Coordination across townships and boroughs within the county is somewhat limited. In general, municipalities in Cumberland County and in other counties in Pennsylvania tend to focus on their own affairs and are not necessarily looking for regional initiatives, due to the set-up of the Commonwealth. That being said, the Cumberland County Planning Department does play a role and helps coordinate municipalities to work together (K. Stoner) as seen in the County Climate Action Plan and the County Comprehensive Plan. There is some coordination between different municipalities for stormwater management to address different watersheds (K. Stoner). There is also the Farmland Preservation Program at the state and county level. This program preserves farmland so that it can act as a carbon sink and help infiltrate stormwater and ensuring we have ample food supply (K. Stoner; Pennsylvania Department of Agriculture, 2022).

There is also coordination between different counties in Pennsylvania. As mentioned previously, the South Central Task Force set up relationships across eight counties (M. Silverstrim; Cumberland County Planning Department & Cumberland County Department of Public Safety, 2020; Pennsylvania Criminal Intelligence Center et al., 2017). There is also the South Mountain Partnership between Franklin, Cumberland,

Adams, and York Counties to help preserve their natural resources, public land, trails, access, and water quality (K. Stoner). In addition, there is the Capital Region Council of Governments (CapCOG), which promotes cooperation and communication for the mutual benefit of its members. There are municipal members, who are citizens from any borough, city, or township in Cumberland, Dauphin, Lebanon, Perry, or York Counties, and there are Associate Members, who are people from government and non-municipal entities such as school districts.

CapCOG has a Stormwater Management Program, in which they help members meet state and federal stormwater mandates through facilitating communication between MS4-permitted as well as non-permitted entities, conducting a training program, and updating participants on legislation, regulations, and best practices, however, this program hasn't run since 2019. They also have a page on their website with a compilation of grants and funding opportunities members can apply for (Capital Region Council of Governments, n.d.). There is also the Tri-County Regional Planning Commission (TCRPC), which aims to foster long-term livability and vitality of the communities of Cumberland, Dauphin, and Perry Counties. One of TCRPC's main programs is the Regional Growth Management Plan, which promotes economic growth and revitalization while at the same time protecting natural resources, optimizing transportation, and recognizing important quality-of-life issues (Tri-County Regional Planning Commission, 2024).

More broadly, there is some coordination between state agencies and programs. The Cumberland County Planning Department is working with the PA DEP on a county-wide plan to reduce nitrogen, phosphorous, and sediment discharges to reduce pollutant runoff (K. Stoner). PEMA (Pennsylvania Emergency Management Agency) and FEMA (Federal Emergency Management Agency) have grants for projects that work on flood mitigation projects (K. Stoner). The Bipartisan Infrastructure Law (federal/state) provides funding for improving infrastructure resilience (Build.gov, 2022). This Law has increased funding for the Building Resilient Infrastructure and Communities annual grant program, which now has \$1 billion available for projects that protect people and infrastructure from natural hazards and the effects of climate change, and for the Flood Mitigation Assistance Program, which now has \$800 million available for projects that mitigate flood risks facing homes and communities across the nation (FEMA, 2023). However, the process to get this funding requires a lot of time and effort to apply for it (K. Stoner). Lastly, there is the Emergency Food and Shelter Grant, which is provided from the federal government and United Way decides where it goes (L. Zander).

3. Community Engagement

Community engagement in planning processes and partnerships varies greatly across the county and the planning topic. There are some organizations that have specific requirements in order to ensure all community members are represented. For example, the United Way Board of Carlisle and Cumberland County that decides who gets money must include a Jewish representative, a clergy representative, a Salvation Army representative, and a recipient of housing. That being said, they frequently have trouble finding recipients of housing that are willing to serve on the board (L. Zander).

In general, community engagement seems limited. Several interviewees stated that community members don't really get involved unless there is an issue that directly, negatively impacts them. For example, when there is planning for climate change, there is strong community engagement from climate change deniers (M. Silverstrim) and those passionate about stopping climate change (K. Stoner). The Carlisle Borough Council will occasionally have public outreach meetings in a location other than Borough Hall to reach a broader audience (S. Taylor). As mentioned previously, during the creation of the Carlisle Strategic Plan, the Carlisle Borough conducted public outreach for community input in a variety of ways, from in-person meetings to social media and emails, among other methods (Carlisle Borough Council, 2023).

However, some interviewees also indicated that they could not control how passionate or involved the community was. While this is true, it seems that, in general, there is little effort overall in encouraging community engagement or understanding why there is little community engagement. The Cumberland County Comprehensive Planning Commission sent out a survey to all County residents to see how many had heard about the Planning Commission and/or attended a municipal meeting. There were roughly 1300 responses (less than 1% response rate overall). About 5% of respondents had heard of the Commission or the County Comprehensive Plan (E. Franco). This lack of knowledge of planning processes and governance may explain the lack of community engagement. Megan Silverstrim suggested increasing community engagement through storytelling and social media. Other methods to increase community engagement must also occur.

3.1. Communication and Public Education

Planning processes communicate information to community members in a variety of ways. Planning departments in each municipality use newsletters, email chains, the press, and social media to contact and engage community members to let them know about the planning documents they've created (K. Stoner). For the commonwealth of Pennsylvania, there are communication resources online from Ready PA. These materials include signups for emergency alerts, what to know to prevent fires, what to do during power outages, and what to keep in one's home and/or car for emergencies (ReadyPA, 2023, Main Page). The emergency alerts include AlertPA by CodeRED, which is for emergency- and weather-related alerts, health notifications, building alerts, and other updates from commonwealth and federal agencies, as well as 511PA, which provides real-time hands-free travel advisories for 40,000 miles of PA roadways (ReadyPA, 2023, Sign Up for Alerts).

There is also the social platform Nextdoor, which can be used to connect a neighborhood together. A county communications staff person posted in Nextdoor about a water conservation order issued for Mechanicsburg. It included a link to the order issued by American Water, which owns and operates the water system in Mechanicsburg. In addition, Stephanie Taylor, Carlisle's public information coordinator, posted information about an annual test of Carlisle's CodeRED system on the Nextdoor app to notify residents of this alert before it occurred this past November. In Carlisle, the public information sent out to residents regarding resilience is mostly general sustainability tips through social media, their website, and their newsletter or severe weather events before they happen and how to prep for these (S. Taylor). In a year, there will be a guidebook by PennFuture to help residents get a say in the infrastructure projects that will take place in their neighborhoods. When it is ready, PennFuture will do a press release and notify their followers via email and social media and will probably utilize news outlets (B. Meyer).

The effectiveness of communication efforts also varies. Some communication is privileged and not inclusive. For example, being prepared for a natural disaster or emergency is a privilege. Those who are food insecure can't stockpile food, those who don't have a basement can't hide during a tornado, and those who don't have a car can't evacuate. Thus, communication needs to take that into account; messaging cannot be the same for everyone (M. Silverstrim). There also needs to be better communication in other languages, not just English (M. Silverstrim). Not all municipalities have the same resources. There is an expectation for instant communication during natural disasters. Some municipalities can do this while others can't. These forms of communication, like social media, texting, etc., can also go down in a natural disaster (M. Silverstrim). However, there are still simple forms of communication, like route alerting, in place for natural disasters in case instant communication fails (M. Silverstrim).

There are some examples of successful public education and communication that could be used as a model to scale up communication efforts in the future. One such is PEMA's social media kits. PEMA provides social media kits to their state agencies and county partners to spread information and those agencies and

partners can customize them for their specific county or municipality to highlight the most relevant information (J. Jumper). Another example would be New Hope's outreach efforts. In a particularly hot or cold spell, New Hope will put out signs and send out media alters to let the community know about their space and what they offer (E. Saunders). As mentioned previously, the Ready PA online resources are available to the community and can influence how people prepare and respond to emergencies. There are also the Cumberland County emergency services and 911 center. They work well with the various municipalities and can respond to emergency events quickly and properly (M. Silverstrim). Cumberland EMS also uses proactive communication to prevent minor emergencies from happening in the first place, such as cases of pink eye, through social media posts and in ABC 27 news station's Good Day PA show (N. Harig). Cumberland EMS also looks at the types of frequent calls they get and incorporate those types of emergencies into their messaging, for example a rise in calls for opioid emergencies leads to more messaging about how to get treatment (N. Harig). There are also specific programs and organizations dedicated to informing farmers and rural communities about preserving natural resources and economic vitality, like the Capital Resource Conservation and Development (RC&D) Area Council (Capital RC&D, n.d.).

In general, there needs to be more education on how climate change will impact individuals in the county. Many assume that natural disasters won't negatively impact them because they haven't before (M. Silverstrim). Residents also need to understand the timeline of emergency response in Pennsylvania as a commonwealth. The municipality responds first for 24 hours and then the county will help out in the 24-to-48-hour window and then the state and federal government can come in (M. Silverstrim). Framing and word choice are important when communicating new plans or implementations, specifically when it comes to climate change. If the new initiative is introduced as something that will mitigate climate change or increase climate change resilience, there are many people who will fight back on it. However, if you don't mention climate change specifically and just mention the reduction of risk regarding extreme weather events and the money it will save in the long run, people are more likely to accept it (K. Stoner; M. Silverstrim).

There is also a bit of a disconnection in terms of who is being reached. Communities that don't speak English are not being reached out to (M. Silverstrim). There are several leaders of organizations and programs that help vulnerable populations in the community that do not know about plans for if an emergency were to happen (B. Raley & R. Brown). United Way of Carlisle and Cumberland County informs the community about the applications by inviting past recipients to apply and putting an advertisement in the local newspaper, so immigrants or residents who just moved here would not be communicated to (L. Zander).

4. Equity

4.1. Vulnerable Populations

There are several populations in Cumberland County and Carlisle that are socially vulnerable to climate-related hazards. Social vulnerability in this sense refers to the propensity of individuals or populations to endure harm when exposed to hazards. On the other hand, resilience refers to the abilities of individuals or populations to anticipate, prepare for, prevent, limit, withstand, recover from, and adapt to impacts of said hazards. Within Cumberland County, the municipalities with the highest overall social vulnerability are Shippensburg Township and Borough, central Carlisle, Enola, and parts of East Pennsboro (Leary, 2023).

Individuals may be vulnerable to climate change due to their economic status. Lower socio-economic status individuals who live in mobile home parks or apartment buildings are particularly vulnerable to flooding and sink holes. They live there because it's cheaper, and it's cheaper to live there because those areas are in high flood or sink hole risk zones. That being said, flooding is becoming more common and not just in those

areas anymore, although these areas are still the most at risk for flooding (M. Silverstrim; E. Saunders). Cumberland County is also the fastest growing county in Pennsylvania and the disparity between individuals is also growing (M. Silverstrim, E. Franco, & N. Harig). Unhoused and low-income populations are also growing due to limited access to affordable housing (B. Raley). Immigrants moving to Cumberland County are vulnerable to climate hazards because they often are low-socioeconomic, and English is not their first language (E. Saunders). ALICE (Asset-Limited, Income-Constrained, Employed) individuals and families (L. Zander), refugees, unhoused people, and single-parent families/homes (R. Brown) are vulnerable to climate hazards since they do not always have the financial means to prepare for or respond to extreme weather events (M. Silverstrim).

Other populations may be vulnerable to climate change due to their inability to adapt when impacted negatively by climate change, or in other words are not resilient. For example, farming and agricultural communities will be largely impacted by climate-related hazards, such as flooding and droughts (M. Silverstrim). These communities will not be able to continue their way of life in this case. The unhoused population is vulnerable to climate hazards because they don't have a reliable place to go when there are extreme weather events (B. Raley). Elderly people in nursing homes are also vulnerable to climate change due to physical vulnerability (age, comorbidities, etc.) as well as the fact that they can't provide for themselves (N. Harig). This is particularly noticeable in Carlisle. In order for elderly to get social services or social assistance programs, they need to be near the county seat and thus must be in or near Carlisle, where there is poor air quality since this is where Interstate 81 and 76 meet (N. Harig). Firefighters and other first responders are vulnerable because their vascular health declines through their service and they get comorbidities. This also means that they're more at risk when there are extreme weather events that will impact their health (wildfires or extreme heat events) (N. Harig).

The Fall 2023 Dickinson College Sustainability Baird Fellows facilitated a community workshop on climate resilience in Cumberland County and Carlisle on December 15th, 2023. Attendees were community members invited by Neil Leary and the Baird Fellows, including interviewees, Dickinson faculty, and Cumberland County residents. There were several focus groups that discussed various aspects and planning areas of assessing climate resilience. One of these groups focused on vulnerable populations. In addition to discussing the previously mentioned populations, the group also brought up Black, Indigenous, People of Color (BIPOC), individuals who are medically vulnerable, and young children. BIPOC are historically more likely to be discriminated against in terms of job, financial, educational, and housing opportunities, just to name a few. With less of these opportunities, these individuals are more vulnerable to climate change, especially if the lack of said opportunities prevents BIPOC from being able to prepare for and/or bounce back from climate hazards. Medically vulnerable populations are also vulnerable to climate hazards since they may not be able to evacuate or prepare for natural disasters in the same way that those without medical issues can. They may also rely on certain medications or medical equipment, which might be unavailable during climate crises. Young children are also vulnerable to climate change since their developing bodies experience the negative health effects of climate change more intensely than a fully developed adult. They also depend on caretakers to provide for them and ensure that they are safe.

Specific percentages of people who are vulnerable to climate-related hazards are highlighted in the Matrix under the column "Resilience Indicators/Metrics". These statistics are from the 2021 United Way Cumberland County ALICE Report (United Way of Pennsylvania, 2021) and the FEMA RAPT Tool (FEMA), which are listed and explained in the following tables.

Table 1: Vulnerable Populations Resilience Indicators/Metrics from the 2021 United Way Cumberland County ALICE Report

| Variables | Cumberland County | Why Variables are Relevant to Vulnerability and Equity |
|--------------------------------------|---------------------------|--|
| ALICE Households | 26% | Indicates limited economic opportunities, which can negatively impact ability to prepare for climate hazards |
| Households in Poverty | 7% | Indicates limited economic opportunities, which can negatively impact ability to prepare for climate hazards |
| Single-Female-Headed (with children) | 69% below ALICE threshold | May indicate limited resources for childcare and/or limited economic opportunities, which can negatively impact ability to prepare for climate hazards |
| Single-Male-Headed (with children) | 60% below ALICE threshold | May indicate limited resources for childcare and/or limited economic opportunities, which can negatively impact ability to prepare for climate hazards |
| Under 25 years of age | 60% below ALICE threshold | May indicate limited economic opportunities |
| Over the age of 65 | 44% below ALICE threshold | May indicate health problems, which can negatively impact ability to prepare for climate hazards May indicate limited economic opportunities |

Table 2: Vulnerable Populations Resilience Indicators/Metrics from the United Way of Pennsylvania ALICE In Each PA County 2023 Report

| Variables | Cumberland County | Dauphin County | York County | Why Variables are Relevant to Vulnerability and Equity |
|--|--------------------------|-----------------------|--------------------|--|
| Percent of ALICE Households (%) | 26 | 25 | 29 | Indicates limited economic opportunities, which can negatively impact ability to prepare for climate hazards |
| Percent of Households in Poverty (%) | 7 | 11 | 9 | Indicates limited economic opportunities, which can negatively impact ability to prepare for climate hazards |
| Single and Cohabiting (% Below ALICE Threshold) | 29 | 31 | 33 | May indicate limited community communication and/or limited economic opportunities |
| Families with Children (% Below ALICE Threshold) | 26 | 33 | 33 | May indicate financial and/or time constraints |
| 65 and older (% Below ALICE Threshold) | 45 | 50 | 52 | May indicate mobility issues |
| Asian (% Below ALICE Threshold) | 31 | 24 | 43 | Financial racial disparities |

| | | | | |
|------------------------------------|----|----|----|--|
| Black (% Below ALICE Threshold) | 63 | 55 | 59 | |
| Hispanic (% Below ALICE Threshold) | 50 | 51 | 61 | |
| White (% Below ALICE Threshold) | 33 | 32 | 36 | |

Table 3: Vulnerable Populations Resilience Indicators/Metrics from the FEMA RAPT Tool

| Variables | Cumberland County | Dauphin County | York County | Why Variables are Relevant to Vulnerability and Equity |
|--|--------------------------|-----------------------|--------------------|---|
| Percent w/o HS diploma | 6.74% | 9.09% | 9.23% | May indicate limited economic opportunities, which can negatively impact ability to prepare for climate hazards |
| Percent household w/o a smartphone | 16.73% | 18.51% | 16.06% | May indicate limited economic opportunities Population that cannot be reached through apps and potentially other digital platforms |
| Percent Mobile Homes | 4.68% | 2.42% | 4.61% | May indicate limited economic opportunities Housing that is vulnerable to climate hazards |
| Percent Owner-Occupied Housing | 67.16% | 58.67% | 71.06% | May indicate economic stability, which can positively impact their ability to prepare for climate hazards |
| Percent without Health Insurance | 5.54% | 5.71% | 4.86% | May indicate limited economic opportunities |
| Percent Below Poverty Level | 7.32% | 12.06% | 8.68% | Indicates limited economic opportunities |
| Median Household Income | \$77,001 | \$66,480 | \$72,543 | Indicates economic opportunities |
| Percent Unemployed Labor Force | 3.54% | 4.51% | 4.66% | May indicate limited economic opportunities |
| Percent Unemployed Women in Labor Force | 3.09% | 4.47% | 4.39% | May indicate limited economic opportunities |
| Percent Workforce Employed in Predominant Sector | 22.99% | 25.12% | 22.22% | Indicates economic opportunities |
| Income Inequality (Gini Index) | 0.42 | 0.45 | 0.42 | Indicates economic opportunities |
| Social/Civic Organizations | 1.67 | 2.57 | 1.45 | May indicate the availability of resources for vulnerable or struggling populations and/or |

| | | | | |
|---------------------------------------|--------|--------|--------|---|
| per 10,000 People | | | | the presence of vulnerable or struggling populations |
| Percent without Religious Affiliation | 58.31% | 55.32% | 65.86% | May indicate the availability of resources for vulnerable or struggling populations |
| Percent Inactive Voters | 11.39% | 8.53% | 6.78% | May indicate community engagement, which influences how the community plans and responds to climate hazards |

4.2. Assistance and Resources for Vulnerable Populations

There are several state and federal programs and resources available to help support vulnerable people. One such program is the Homeless Assistance Program helps to prevent homelessness, provides refuge for those who are homeless or unhoused, and helps homeless individuals become self-sufficient. Their website includes a county contact list, which provides individuals with the name and phone number of the organization in their county who can help them with their housing situation directly. Other services provided include case management to prevent becoming homeless again, rental assistance to prevent eviction, bridge housing to live in a shared facility or apartment for up to 18 months, emergency shelter to have housing for a short amount of time, and innovative supportive housing service (Pennsylvania Department of Human Services, 2023). There are several resources specifically for food insecurity. One is the PA Department of Agriculture Food Security website. This website provides information on PA 211, local food banks, food rescue organizations, pet food resources, and state and federal resources, like WIC, school nutrition programs, the Emergency Food Assistance Program, and many others (Pennsylvania Department of Agriculture, 2023). Another is the Feeding America website. This website provides information on finding food banks and how prevalent food insecurity is in various parts of the US (Feeding America, 2023).

There are also resources at a more local level. Some of these resources focus on providing immediate assistance. For example, New Hope Ministry offers meals, access to showers, internet access, and daytime shelter on a day-to-day basis. In a particularly hot or cold spell, New Hope will put out signs and send out media alerts to let the community know about their space and what they offer. New Hope serves as a point of contact to get people to emergency shelters since they work with other nonprofit and governmental entities (E. Saunders). New Life Community helps with food insecurity, financial crises, drug and alcohol recovery, mental health, and reentry from incarceration. New Life Community partners with Project Share, Salvation Army, Community Cares, Safe Harbor, Christian Wellness, Tomorrow’s Neighbors, and Sadler Health. New Life Community’s Life House is a transformational house with three family units. New Life Community has counselors and recovery groups. New Life Community provides furniture and household goods for anyone moving from homelessness into a home (R. Brown).

There are also local resources that focus on providing grants to help individuals in the long term. Partnership for Better Health provides grants to promote and improve individual and community health. They partner with UPMC and Penn State Health to help address health concerns for vulnerable populations and with Community Cares in Carlisle to help with homelessness (B. Raley). United Way of Carlisle & Cumberland County raises funds that they put back into the community through partner agencies who directly use the funds United Way provides them to address the most pressing needs of the community. They also offer scholarships to families that are low-income. This includes their Heating Assistance Program. Once someone exhausts LIHEAP (the county heating assistance program), United Way can help them. United Way also acts as a referral for people who walk in and need help in other words, United Way doesn’t help them directly, but they know who can help them and guide them towards them. United Way’s Natural Disaster Fund includes actively raising money when a disaster occurs so that people in the community that want to help out donate

money to the fund (L. Zander). All programs improve vulnerable populations' conditions but do not solve or eradicate poverty (E. Saunders).

As noted previously, there are several leaders of organizations and programs that help vulnerable populations in the community that do not know about plans for if an emergency were to happen. They also do not know of a centralized place to put all information about services so that it's easier to access everything (B. Raley & R. Brown). 211 exists and serves this function, however, if the leaders of our organizations and programs do not know about it, then that is a cause for concern.

5. Conclusion

In conclusion, Cumberland County has plans for addressing climate hazards and increasing climate resilience in place, however not all municipalities do. Some plans directly address climate-related hazards and/or climate resilience, such as the Hazard Mitigation Plan and the Climate Action Plan. The Hazard Mitigation Plan does so through its description of how climate change will worsen current hazards that we experience. The Climate Action Plan identifies impacts of climate change and strategies to mitigate climate change. Other plans indirectly address climate resilience. These include the Comprehensive Plan, the Emergency Operation Plan, Stormwater Management Plans, and the Carlisle Strategic Plan. It should be noted that the upcoming revision of the Comprehensive Plan will directly discuss and plan for climate change resilience. Some of these plans are merely suggestions and do not have legal authority to enforce them, which can prove problematic. Other plans can be implemented through various codes, ordinances, organizations, and departments, notably the South Central Task Force and the Cumberland County Planning Department.

There is some coordination across plans and partnerships, which can be between municipalities, between counties, or between state agencies. The main coordinator within Cumberland County regarding planning processes is the Cumberland County Planning Department. Some organizations that promote coordination between several counties include the South Central Task Force, the South Mountain Partnership, the Capital Region Council of Governments, and the Tri-County Regional Planning Commission. State agencies and programs that coordinate with the Cumberland County Planning Department include PEMA and FEMA. There are also grants and funding opportunities and programs provided by the federal government, such as the Building Resilient Infrastructure and Communities annual grant program, the Flood Mitigation Assistance Program, and the Emergency Food and Shelter Grant.

There is somewhat limited community engagement, which emphasizes the need to understand why that is and work towards increasing it. There is sufficient and reliable emergency services communication, however, communication regarding planning and processes could be improved. In general, communication must be more inclusive in terms of providing multiple resources and communicating in multiple languages.

Cumberland County has populations that are vulnerable to climate hazards, specifically unhoused populations, ALICE/low-income populations, climate refugees, farming/agricultural communities, elderly populations, emergency first-responders, BIPOC, medically-vulnerable individuals, and young children. It is important to consider that Cumberland County is the fastest growing county in Pennsylvania and the disparity between individuals is also growing. There are some services and resources to help these vulnerable populations, however, communication regarding these services is limited for some populations.

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Interviews

| Interview Subject | Organization/Position | Date (2023) |
|--------------------------|--|--------------------|
| Brown, Ryan | Senior Pastor, New Life Community | November 8 |
| Franco, Ed | Member of Cumberland County Planning Commission, member of Lower Frankford Township Planning Commission, Friends of Possum Lake, and Conodoguinet Creek Watershed Association. Was also on the board of Sadler Health Clinic and was (is) a clinical psychologist. | November 2 |
| Harig, Nathan | Assistant Chief of Administration, Cumberland Goodwill EMS | November 13 |
| Jumper, Jeff | Program Manager of Resiliency Bureau of Mitigation, Insurance, and Resilient Communities at the PA Emergency Management Agency | November 16 |
| Meyer, Bridgitte | PennFuture, staff lawyer | October 25 |
| Raley, Becca | Executive Director of Partnership for Better Health | October 27 |
| Saunders, Eric | Executive Director of New Hope Ministries | October 23 |
| Silverstrim, Megan | Director of Communications & Marketing, Shippensburg University | October 10 |
| Stoner, Kirk | Director of Planning for Cumberland County | October 16 |
| Taylor, Stephanie | Public Information Coordinator for Carlisle Borough | October 19 |
| Zander, Lucy | Executive Director of United Way of Carlisle & Cumberland County | November 3 |