Massachusetts Climate Resilience Planning and the Needs of People with Disabilities: Paths to Improvement

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“The idea that some lives matter less is the root of all that’s wrong with the world.”
Dr. Paul Farmer

ABSTRACT

People With Disabilities (PWDs) face four-fold higher death rates from climate emergencies, yet are often omitted from climate resilience planning. This project successfully catalyzed actionable PWD inclusion via Massachusetts's Municipal Vulnerability Preparedness (MVP) program, which provides municipalities with climate resilience funding and resources. At this project's start, MVP mentioned PWDs only as an additional vulnerable group, as if homogeneous, without actionable strategies. MVP is currently undergoing a 5-year update. As 95% of Massachusetts's municipalities participate, any changes will be disseminated state-wide.

This project communicated to MVP the intersections among several climate hazards and accessibility needs. A policy is proposed to: (1) specify functional limits across disability types; (2) identify limits most salient in varied climate emergencies; (3) identify and remove barriers to accessing publicly available emergency resources, such as evacuation alerts. A tool was developed that incorporates the above in a single document, with resources for removal of barriers. These products are being presented to MVP, as well as introductions to PWD disaster mitigation specialists for ongoing input. An MVP official stated that, as this project has brought to their attention the relevance of disabilities to climate resilience, disability needs will be included in this year's update.

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ABBREVIATIONS

- CRB - Community Resilience Building. A set of planning processes used by MVP. It was intended to be a “community-driven process” with active outreach to increase diversity, in which community “participants identify top hazards, current strengths, challenges, and priority actions to improve community resilience for all hazards today, and in the future.”

- PWD - People with Disabilities. In the singular, it is used here as an adjective, as in “PWD-relevant planning”. PWDs, in the plural, is used to refer to the people themselves.

- MVP - Municipal Vulnerability Preparedness program, a Massachusetts state initiative that helps cities and towns do local climate resilience planning and implementation.

- MVP Framework - Guidance made available to municipalities which sets expectations for outcomes, and offers tools and processes for reaching them. This is currently being updated, to be distributed to municipalities in 2022.

- “The Partnership” - The Partnership for Inclusive Disaster Strategies, a 501(c)(3) specializing in disability advocacy and inclusion in disaster planning and relief.

INTRODUCTION

Organized efforts to minimize the impact of climate change are being undertaken at all governance levels, from the international to the local, with the major focus at the local level being resilience: minimizing climate change's negative impacts on people, places, and systems. Resilience includes protecting the most vulnerable populations, including the elderly, people living in poverty, and members of disenfranchised minorities. Although 26% of adults in the United States have some type of disability (CDC, 2019), those with disabilities are rarely explicitly identified by climate change media or planners as being among the populations vulnerable to climate change (Saxton & Ghenis, 2018). Yet, people with disabilities are *four times more likely to die from disasters than people without disabilities* (Calgaro, 2021).

In Massachusetts, climate resilience planning at the state level centers on the Municipal Vulnerability Preparedness (MVP) Program. MVP is a state grant and technical assistance program providing municipalities the support to plan for climate change resilience. Operating under the auspices of the Executive Office of Energy and Environmental Affairs (EEA), it is intended to help protect all residents from the impact of climate change, with additional focus on vulnerable populations. This program, unusual in having a state resilience program work with each municipality, has proven popular: over 95% of the state's municipalities voluntarily participate.

MVP is directed to include the needs of vulnerable populations in their work with municipalities, though without explicit guidance to focus on people with disabilities (PWDs). However, PWDs are among the most vulnerable to climate disasters because they are often unable to access resilience or emergency resources intended for the entire public. As appropriately inclusive planning that addresses the needs of particular vulnerable populations can make resilience

resources more accessible to all, it is reasonable to expect a governmental program to take action on this.

The MVP program provides guidelines to participating municipalities, although each locale autonomously devises a locally appropriate plan to meet the guidelines, consistent with locally-determined priorities. In practice, any resilience planning goals omitted at the MVP level are much less likely to be addressed in municipal level resilience plans, as the many small municipalities have small staffs, and are charged with providing residents' needs in multiple spheres. Therefore, MVP materials and guidance strongly influence the extent to which PWD issues are addressed, or omitted, within any municipality's plans.

Up until now, PWD-relevant materials and guidelines which MVP has provided to municipalities have been limited to an unspecific encouragement to consider the needs of all vulnerable groups, including "people with disabilities". Examining the Planning Reports produced by a selection of municipalities shows that, in practice, this has meant that in most municipalities, there is no specific planning yet for the needs of PWDs in extreme climate events.

The goal of this project has been to identify gaps and suggest improvements in climate resilience planning as these affect PWDs. It identifies elements needed in a disability-inclusive framework suitable for use in MVP, including approaches for classifying the functional needs of PWDs in different climate hazard events. It highlights the need to identify and remove barriers to accessing existing publicly-provided emergency resources, such as evacuation alerts. The researcher also engaged disability advocates and organizations throughout the project's development, and identified Massachusetts and other PWDs interested in sharing their expertise with the MVP program.

The project provides the MVP program with tools to consider different approaches to PWD needs in their planning, and to give municipalities additional tools to better serve some of the most vulnerable people in their communities. These contributions are provided to the MVP program with the goal of catalyzing actionable inclusion of PWDs' needs, and the expertise of PWDs themselves, in the program's five-year update in 2022. It is hoped that this research will contribute to the updated framework, allowing MVP to help municipalities identify and address the varieties of PWD residents' needs in the context of climate hazards common to their locale.

Update to this report: As part of this project, the researcher interviewed an MVP official about PWD omission in their planning, and offered to identify and share PWD-specific planning which can mitigate PWDs' disproportionate harm in climate emergencies. This official agreed that MVP needed to rectify this omission, and welcomed resources and recommendations identified through this research. During ongoing communications with the researcher, the official stated that MVP would now commit to including PWD-specific materials in the guidance sent to the municipalities in the five-year MVP update. The MVP official also committed to adding a PWD activist to MVP's Equity Council, and asked to see this report when completed.

Since planning for the MVP update is in the very earliest stages, this research reflects the situation as it has existed since MVP's inception five years ago.

2. LITERATURE REVIEW

Resilience planning for climate change can help protect the most vulnerable populations, but seldom explicitly addresses the particular needs of PWDs, and the barriers impeding their access to services that are meant for all. Needs and barriers vary with each type of disability. When barriers to accessing basic services are not identified and removed, PWDs suffer disproportionately higher deaths and other serious outcomes in climate emergencies. Conversely, identifying specific needs and offsetting barriers to services can help prevent disproportionate deaths among people with disabilities, as well as others who do not identify themselves as disabled. As with other aspects of climate resilience and adaptation, this planning is most effective in partnerships among PWDs, municipalities, other local services, such as first responders and community agencies, and larger local entities, such as the state.

Reporting in the aftermath of Hurricane Katrina revealed the disparate access to public resources by PWDs, including “tragic photos of dead people in their wheelchairs as crowds of other displaced people streamed by” (Saxton & Ghenis 2018, p. 2). As FEMA’s Administrator Craig Fugate said at the Inclusive Hurricane Conference in Biloxi, Mississippi, “My experience tells me if we wait and plan for people with disabilities after we write the basic plan, we fail.” This implies that PWD concerns must be integral to resilience planning, not an appended “special needs” afterthought. For a program to be “disability inclusive” it must identify specific barriers to accessing resources intended for all, and implement ways to remove those barriers.

What background would be needed to begin implementation of such planning? Before committing to a new endeavor, any organization with extensive responsibilities and limited resources must assess whether there is indeed a problem; determine whether it is sufficiently addressed, or else identify omissions and ways to correct them; and see where it might fit into

the program's current mission and structure. This literature review provides a background to address each of these concerns.

First, the question of whether there is indeed a problem with current PWD-relevant resilience planning is informed by the disproportionate impact of climate hazards on PWDs, manifested in higher death rates and disproportionate inability to regain prior levels of income and autonomy. The existence of disproportionate impact is evidence that this group is underserved, suggesting that the status quo is insufficient. The question of whether this disproportionate, negative impact is related to omissions in planning can be answered by the existence of unique barriers to PWDs accessing publicly available resilience resources, such as emergency communications. Determining ways to correct these unique and unintentional barriers depends on identifying their causes, which are also addressed in the literature review. These causes include lack of proactive inclusion of PWDs in climate resilience planning, unintentional barriers to community input, historical inequities, and not having identified qualitatively different functional disabilities.

Finally, to consider where these changes might fit into the mission and structure of climate resilience planning in Massachusetts, section 2.2 below is an overview of MVPs operational structure, highlighting organizational resources that might be deployed to make any changes deemed appropriate in PWD-informed resilience planning. Climate hazards which Massachusetts faces are also summarized for context. This background then leads to the Methods section.

2.1. PWDs experience disproportionate impacts of climate hazards

Before an organization begins deciding whether to address the issues of an additional, vulnerable group, discussions of equity often arise, with questions about the appropriate

distribution of finite resources to meet the needs of various groups. In this context, the disproportionate impact of climate hazards on PWDs is very relevant. PWDs experience disproportionately more death, illness and loss from climate change events. PWDs are four times more likely to die when a disaster strikes than those without disabilities (Calgaro, 2021). This fact alone demands additional attention to PWD needs in resilience planning.

Medical conditions can increase climate-related risk, as some disabilities arise from conditions that increase medical risk in the face of climate change and related disasters. For example, people with spinal cord injuries are unable to regulate heat well, making them more vulnerable to increasing temperatures and extreme heat events (Saxton & Ghenis, 2018). According to the Massachusetts State Hazard Mitigation and Climate Adaptation Plan (SHMCAP), PWDs are vulnerable across every category of weather and climate hazards they catalog, while many other vulnerable groups are vulnerable to some, but not all, climate hazards identified. (MVP, Chapter 3, p. 7, 2018)

2.1.1. Intersectionality: disability disproportionately intersects with other causes of marginalization

One reason PWDs suffer such grave consequences from climate disasters is that planning often regards them as a separate group, rather than considering the disproportionate lack of resources and possible discrimination they may experience from other factors as well. In a review of the impact of the Sendai Framework for Disaster Risk Reduction 2015-2030 (SFDRR), intersectionality (“being a person with a disability and also a member of another dimension of potential vulnerability”) was said to “lead to further marginalization, discrimination, or difficulties during disasters” (Bennett, 2020). Failure to include intersectionalities was described as a cause for the limited impact of this Framework.

In addition to the vulnerabilities caused by disabilities alone, adults with disabilities in the US are more than twice as likely to live in poverty than those with no disabilities (27% compared to 12%). Black/African American adults with disabilities experience an even higher rate of living in poverty (37%, compared to 20% without disabilities) (Goodman et al., 2019). Marginalization and poverty translate into less access to resources even before a crisis event, fewer resources to plan for that event on an individual level, and fewer savings to bounce back from such an event. The picture is similar in other parts of the world (UNESCAP, 2017). Poor and disabled people disproportionately live in areas of high climate hazard. Poverty and marginalization generally result in residing in areas considered undesirable, which may include being more prone to flooding, fire and excess heat. For example, flooding in one area of Texas from Hurricane Harvey in 2017 was found to have been “significantly greater in neighborhoods with a higher proportion of disabled residents, after controlling for race/ethnicity, socioeconomic factors, and clustering” (Chakraborty et al., 2019). A recent study predicts that in Texas and the US South and Southeast, in the coming years there will be a 40% increase in flooding in places where 20% or more of the population is Black (Hersher, 2022).

People of low socioeconomic status are, post-disaster, much more likely to have disruptions to their employment, income, and housing than better resourced people. These disruptions are often multiplied for people with more than one vulnerability, such as very young or old, living with a disability, etc. (Substance Abuse and Mental Health Services Administration - SAMHSA, 2017). In addition, for PWDs, a disaster event is frequently compounded by loss of employment and income, and can lead to loss of assistive devices, ranging from basic wheelchairs to cutting-edge digital technology for people without vision or hearing. Devices lost or damaged during such events are less likely to be replaceable, representing an ongoing loss of autonomy, which also diminishes chances of regaining employment.

A specific complaint about loss of the ability to live at one's pre-evacuation level of independence, made in a weekly stakeholder call by The Partnership, highlights this issue (M. Roth, personal communication, March 1, 2022). It was stated that, after evacuation due to disasters, FEMA often places people with varied abilities and disabilities in places whose restrictions exceed those of their normal housing and decrease their independence. This may be appropriate for immediate, temporary shelter, but the complaint is that they are often left there indefinitely as it is perceived that their needs have been met. This is alleged to violate the provision of the Americans with Disabilities Act, which guarantees the right to have services provided in the Least Restrictive Environment (ADA,1990). In addition, placement in congregate housing is a public health risk, as evidenced during the Covid pandemic (January 25, 2022). SILVER group (Saving Institutional Lives Via Emergency Relocation).

2.1.2. PWDs' unique barriers to receiving and acting on public emergency guidance

Disabilities may make it more difficult to perceive and act on existing public safety information during emergencies, or take advantage of proffered resources intended for the whole public, unless the information is inclusively planned to take varied disabilities into account. In the US, PWDs include those with disabilities affecting the ability to see (4.6 % of US PWDs); hear (4.6%); walk or climb stairs (13.7%); or focus, remember, or make decisions (10.8%). In addition, 3.6% of US PWDs have difficulties with self-care and 6.8% have difficulty doing errands alone. For those who rely on assistance from personal care attendants, neighbors, or family for support even when there is no climate or public health emergency, disruptions during climate emergencies may cut off access even from the usual level of support, much less make it possible to obtain additional resources to act rapidly in emergencies (CDC, 2019).

The importance of information and communication technologies in response to disaster is strongly emphasized in The Sendai Framework, especially as they relate to the communication

of the nature of risks. However, for communication to be effective, it is crucial to consider individual differences in the disabilities and abilities of individuals, remembering that what is accessible to some may not be accessible to all (UNISDR, 2015).

2.1.3. Factors contributing to omission of PWD needs in climate resilience planning

Among many PWDs, the distinction is made between plans made by others without disabilities and those made by PWDs or with significant PWD input. This section explores some of the reasons this matters, and causes of unintended exclusion from climate resilience planning.

PWDs themselves are insufficiently included in resilience planning

Those who are in the greatest need within climate planning are often excluded from the conversation themselves, on the assumption that it is sufficient for professionals without disabilities to speak on their behalf (Chertock, 2020; Clendening, 2021). This widespread lack of representation by PWDs in forming such policies and plans causes difficulties in two ways. First, accuracy is diminished: without input from people who need different resources from one's own to perform the activities of daily living, any planning is likely to miss crucial elements. Planning exercises sometimes involve people without disabilities attempting to play the role of people who are deaf, blind, or wheelchair users; this seldom identifies salient issues (Kailes, 2020b). For example, ASL signers need to wear a solid-colored shirt which contrasts with their skin tone to increase intelligibility, something a hearing person would be unlikely to guess (Caron, 2017).

Beyond the fact that lack of representation can lead to dangerously flawed planned, not including PWDs' voices in making decisions that affect their lives and safety can be seen as a denial of the dignity and autonomy so often denied PWDs, encapsulated in the demand, "Nothing about us, without us" (Disability Minnesota, 2015). This can be best understood within

the context of the history of PWDs, even in the 20th century in the US, being denied agency in making their own life decisions, as noted in the section on historical inequities, below.

Unintentional barriers to community input by PWDs

Unintentional barriers can limit PWD participation in events intended to garner community input. These include physical barriers (e.g., settings inaccessible to wheelchairs); logistic barriers (e.g., locations not served by public transportation; insufficiently accessible directions within large buildings) and communication barriers including initial outreach (e.g., inaccessible to people with hearing or visual impairments, or low literacy). PWDs experience greater poverty, so financial barriers may impede both transportation costs to in-person events as well as equipment and bandwidth to access virtual events. In such cases, the absence of PWDs' voices may result in something analogous to a false negative; that is, it may give a false impression that there is no unmet need (WHO, 2021). Regarding MVP specifically, it is possible that the absence of specific, identified PWD concerns inadvertently began during this early community outreach stage. Then, as is expected in formal planning, issues not raised in initial planning stages are generally not re-examined in execution stages. This is further explored within section 4.1, in the subsection "PWDs inadvertently omitted from inclusive outreach efforts in early MVP community planning".

Historical inequities and discrimination faced by PWDs in the US

In considering how PWDs might perceive programs that do not explicitly include them, non-disabled resilience planners might benefit from knowing something about the history of disability inequities and discrimination. Historically, people with disabilities have been afforded less of whatever were the assumed rights of the non-disabled in that place and time. This has included, in the 20th century in the U.S., being "Institutionalized regardless of needs, e.g., a person with cerebral palsy was considered mentally retarded; housed in separate institutions; not allowed to

attend neighborhood schools; involuntary sterilization…to prevent the passing on of inferior traits; considered by eugenicists as defective and an interference with the process of ‘natural selection’" (Sage Publication, n.d.; ADA Legacy Project, n.d.). Socio-cultural norms in varied times and places have framed disabilities as caused by insufficient religious faith or divine punishment; identified the person with disabilities as an object of pity with strengths and abilities overlooked; or even seen disability as something that makes a PWD generally "less than" a full person (Calgaro, 2021). As a result, the process for people with disabilities to have an equal voice in community planning or legislation has been a centuries-long struggle.

Failure to identify qualitatively different functional disabilities

"Realistic consideration must include attention to specific, accurate approaches to assistance in extreme circumstances.” The major six categories of disability most often used by the U.S. government result in “generalities” that are “useless” in planning for climate emergencies without more specific “intersectional factors”, including “the effects of extreme heat on people with spinal cord injuries (who are unable to perspire); effective technologies for alerting people with hearing impairments on evacuation planning; approaches to feasible evacuation transportation for persons using respirators, who are unable to safely utilize standard evacuation methods (.e.g., buses.)" (Saxton & Ghenis, 2018). “People with disabilities are not a homogenous group, and therefore there are potential problems with disaster policies and procedures that do not include people with varying disabilities during disaster planning” (Bennett, 2020).

There are major objections to the category “special needs” in planning for PWDs’ needs in emergencies. Kailes states, “An essential element of building appropriate levels of capacity, specific planning, and response success is to move beyond use of the ‘special needs’ category, to better identify and address the diverse needs of those included under this label” (Kailes,

2007). A further objection to this language, identified by Roth (2010), is that ”When people with disabilities are thought of as ‘special,’ they are often thought of as marginal individuals who have needs, not rights”.

In response to the inadequacy of many prevailing descriptions of PWDs and their functional needs in disaster and resilience contexts, Kailes developed the C-MIST framework (Kailes, 2007). She aims for “the development of a more accurate and flexible planning and response framework based on essential, sometimes overlapping, functional needs: *communication, medical needs, maintaining functional independence, supervision, and transportation* (C-MIST)” (Kailes, 2007). This was modified in 2020 to include: “communication; maintaining health; independence; support, safety, and self-determination; and transportation”. Kailes notes in particular the inadequacy of a medical diagnosis in functional planning (Kailes, 2020). It should be noted that the term “framework” can refer to many degrees of specificity and elaboration; the original work by Kailes is valuable as a guide to thinking differently about needs, rather than a finished framework identifying ways to specify and meet needs.

2.2. Massachusetts climate resilience planning

Massachusetts has been a leader in governmental climate action, both mitigation and adaptation, since the late 20th century. The state (officially a Commonwealth) was a principal in the creation of the Regional Greenhouse Gas Initiative in 2005 (with roots in the 1990s), an ongoing greenhouse gas mitigation cap and trade system to reduce emissions from the energy sector (RGGI, 2021). In addition, there have been long-standing, consistent efforts to adapt infrastructure to the major local climate-related hazards of worsening severe weather events, evermore tightly linked to climate change. In the 1980s, the siting of the rebuilt Deer Island sewage treatment plant in Boston harbor was elevated several additional feet above what were then the worst-case storm surge estimates (USEPA, n.d.). Now, with state mitigation and adaptation efforts continuing, and being synthesized into resilience planning, Massachusetts has put this commitment into law and action.

Climate threats addressed by Massachusetts resilience plans

The effects of climate change are a serious concern for officials at the local level, as revealed in a 2021 survey by researchers from the University of Massachusetts, Amherst. Officials from all of the state's 351 towns and cities were asked about the impacts of climate change in their locale. Of the 111 locales whose officials responded, virtually all noted the impact of climate change in their municipality. These collectively included almost all the hazards defined by the 2018 Massachusetts State Hazard Mitigation and Climate Adaptation Plan as "primary areas of risk assessment", including those arising from changes in precipitation, sea level rise, rising temperatures, and extreme weather (Figure 1). Negative effects described by respondents included loss of life, health problems, economic costs, loss of population, loss of marine industries, and loss of housing due to erosion. Officials reported that, as local leaders, it was they who were expected to attend to these local emergencies, but many described a feeling of

helplessness. The majority had already participated in MVP's planning grants, with 89% stating that their MVP planning documents prioritize climate adaptation and resilience planning. 75% considered PWDs to be a vulnerable group, but the responses emphasized that the mayors and local officials had no extra time to take on additional tasks to address this need (Vicarelli et al., 2021). In this respect, MVP provision of guidance and resources to address PWD resilience would appear to meet a well-documented need.

Climate hazards: slow onset vs. sudden onset events

Climate hazards that endanger PWDs (and the general public) can be described in terms of slow onset events, such as sea level rise, and rapid onset events, such as life-threatening floods (UNHCR, n.d.). Research literature and resilience and adaptation plans are often addressed to one or the other, but these distinctions are not mutually exclusive for PWD resilience planning. For example, sea level rise leads to more frequent and severe floods; in both cases, resilience plans must include PWD flood evacuation. Increased global temperatures lead to more frequent heat emergencies; both require attention to disabilities that impair the body's thermoregulation ability. In Massachusetts, the Department of Environmental Protection list of primary (climate) risk assessment areas (Figure 1) includes hazards within each threat category, occurring on different time scales (MassDEP, 2018). Climate hazards, regardless of onset time, have a disproportionately high impact on PWDs, so both are considered together as they apply to PWD-inclusive resilience planning.

Figure 1

Primary areas of risk assessment from the 2018 Massachusetts State Hazard Mitigation and Climate Adaptation Plan (MassDEP, 2018).

Primary Climate Change Interaction: **Changes in Precipitation**

Inland Flooding (Including Dam Overtopping)

Drought

Landslide

Primary Climate Change Interaction: **Sea Level Rise**

Coastal Flooding

Coastal Erosion

Tsunami

Primary Climate Change Interaction: **Rising Temperatures**

Average/Extreme Temperature

Wildfires

Invasive Species

Primary Climate Change Interaction: **Extreme Weather**

Hurricanes/Tropical Storms

Severe Winter Storm / Nor'easter

Tornadoes

Other Severe Weather

Non-Climate-Influenced Hazards

Earthquake

Massachusetts Municipal Vulnerability Preparedness Program (MVP)

As demonstrated, a crucial component of the state climate resilience efforts is planning and implementation on the municipal level. This is facilitated and coordinated by the MVP program, which was created in 2017. It is directed to provide support for cities and towns in Massachusetts to "identify climate hazards, assess vulnerabilities, and develop action plans to improve resilience to climate change". Communities that elect to take part in the MVP Planning Grant process, upon completion become designated as an MVP Community. They are then

”eligible for MVP Action Grant funding to implement the priority actions identified through the planning process.” (MVP, n.d.). MVP is a voluntary program, with, as of this year (2022), over 95% participation rate. All of the 16 non-participating towns are very small in population.

Programmatically, MVP assists and engages the participating municipalities with both funding and technical assistance. The MVP Framework is the key guidance made available to municipalities, which sets expectations for their programmatic outcomes, and offers tools and processes for reaching them. MVP has a professional staff of seven.

Grants to Municipalities

There are two stages of grants to support climate resilience planning for municipalities - Initial planning, and implementation grants

“The MVP Planning Grant offers funding to municipalities that wish to assess their vulnerability to and prepare for climate change impacts, build community resilience, and receive designation as an MVP Community.” (MVP, n.d.)

“The MVP Action Grant program is open to municipalities who have completed the MVP planning process and invests in municipal priorities that build resilience. Projects can range from a vulnerability assessment of a specific sector to an outreach and engagement campaign to constructing green infrastructure that takes into account climate change projections. We are looking for proactive adaptation projects that utilize the best available climate data, that are rooted in natural systems as much as possible, and that put environmental justice and equity front and center.” (MVP, n.d.)

Technical Assistance MVP offers municipalities

MVP provides a wide range of assistance to the municipalities in a variety of modes.

Planning/organizational toolkit: Community Resilience Building (CRB) Framework Developed by the Nature Conservancy, it leads the municipalities toward a community-driven process, where participants identify top hazards, current strengths, challenges, and priority actions to improve community resilience for all hazards today, and in the future. (Massachusetts EEA, 2021).

MVP Framework: In depth planning and operational toolkit

MVP maintains a substantial and growing resource covering a wide range of climate resilience planning tools.

MVP "Certified Providers" is a diverse network of vetted subject matter experts who assist municipalities in completing various parts of their plans with which they need help. They are also available for post-grant consultations. There are currently over 350 providers state-wide.

Peer-to-peer assistance

MVP has developed a robust peer-to-peer framework for municipalities to exchange valuable up-to-date resources via**:** webinars; exemplary grant proposals posted; shared plans; examples of tools such as local newsletters, and more.

Equity council

The MVP equity council is an expert and community advisory panel that helps develop policy and advice for the program and for the municipal partners..

Toolkits - subject focused

Nature-Based Solutions

Environmental Justice & Equity

Public Health & Healthcare

Virtual & Remote Engagement

(MVP, n.d.).

Other guidance and materials

The MVP website has a host of sample documents, from successful grant proposals and examples of outreach materials, to project implementation documentation for a variety of types of projects and a library of climate resilience plans.

MVP is currently performing its five-year review and update. (American Planning Association, 2021).

Massachusetts regulations, agencies, and programs for climate resilience planning

Although MVP is the climate resilience program in which the researcher hopes to catalyze PWD inclusion, MVP exists within a network of governmental structures. These are described here to provide context within which the program exists. This interdependence is consistent with the recommendations of the "Climate Action Pathway: Climate Resilience" from the United Nations Framework Convention on Climate Change, which states that "Building climate resilience involves all actors (governments, communities and businesses) having the capacity to anticipate climate risks and hazards, absorb shocks and stresses, and reshape and transform development pathways in the longer term" (United Nations Framework Convention on Climate Change, n.d.). The special role of municipalities and states is indicated by the Natural Resources Defense Council: "(Climate) *adaptation* and *resilience* have devolved to the purview

of sub-national governments, especially municipalities, and even to the individual (Natural Resources Defense Council, n.d.).

Massachusetts State Climate Resilience Planning and Implementation

Executive Order No. 569 (2016) directs state government to "coordinate efforts across the Commonwealth to strengthen the resilience of our communities, prepare for the impacts of climate change, and to prepare for and mitigate damage from extreme weather events." It established an Integrated Climate Change Strategy for the Commonwealth. The Order placed climate resilience planning under the auspices of the Executive Office of Energy and Environmental Affairs (EEA). EEA is empowered by the Order to create regulations, guidelines, and other planning and implementation products and tools.

Massachusetts State Hazard Mitigation and Climate Adaptation Plan (SHMCAP)

It is noteworthy when a voluntary government program, such as MVP, is joined by over 95% of eligible local governments. One inducement is that a finished MVP plan can do double duty as the mandated state SHMCAP plan. This is in addition to MVP providing municipal officials with ways to ameliorate some of the effects of climate change for which residents most urgently request assistance, as well as offering both technical assistance and funding.

EEA convened government staff from EEA and the other Executive Offices (equivalent to government departments), as well as non-governmental climate and climate resilience experts, and other subject-matter specialists, to create, and now oversee the SHMCAP[3]. SHMCAP goals are to "effectively reduce the risks associated with natural hazards and the effects of climate change,…projected changes in precipitation, temperature, sea-level rise, and extreme weather events… climate change impacts and adaptation strategies with hazard mitigation planning." (MassDEP, 2018).

The SHMCAP creates, initiates the operationalization process, and evaluates climate resilience activities in the state. A Resilient MA Action Team (RMAT), led by EEA and the Massachusetts Emergency Management Agency (MEMA), is an inter-agency team comprised of Climate Change Coordinators from each Office, that monitors SHMCAP implementation, facilitating coordination across State government and with stakeholders, and making recommendations to, and supporting agencies on plan updates. The various Executive Offices and RMAT have the primary responsibility for carrying out the Plan. (MassDEP, 2018).

The SHMCAP group's separate, formal hazard mitigation function also serves as the interface between Massachusetts and Federal programs to maintain eligibility for federal disaster recovery and hazard mitigation funding. (MassDEP, 2018).

MVP in an international and national context: proposals to include the needs of PWDs in resilience planning

A large part of this research project has included identifying MVP's omissions in PWD inclusion. However, it should be acknowledged that there are few or no places in which PWDs' needs are actually well served by governments and NGOs at any level, including at the national and international levels.

At the international and national level, several high-level official documents have called for specific inclusion of PWDs' needs in resilience and disaster planning. One of the very few official analyses of PWD inclusion or exclusion in reducing risks in disaster is the Sendai Framework for Disaster Risk Reduction 2015–2030 (SFDRR). A review five years after its release (Bennett, 2020) stated that progress for PWD disaster risk reduction had been made in

some countries; no progress at all had been made in others; and that misapplication of disability categories had caused some PWDs to actually lose disaster risk reduction resources.

The “Incheon Strategy” to ‘Make the Right Real’ initiative for Persons with Disabilities in Asia and the Pacific is another key Pan-Asian effort to systemically improve the lives of PWDs. It was developed by the UN Economic and Social Commission for Asia and the Pacific (UNESCAP) in 2012 at a meeting in Incheon, South Korea. The outcome is a set of development targets and an implementation schema parallel to the UN Sustainable Development goals, and interwoven with elements of the UN Rights of the Disabled. The Incheon Strategy underwent a 2017 Midpoint Review to assess implementation progress from 2013-2017. The review showed that little progress had been made in Goal 7, “Ensure disability-inclusive disaster risk reduction and management” and that these efforts were still marked by the inequalities which the Strategy was intended to change. The perception of the inefficacy of these initiatives by many high-level disaster and disability professionals is implied by the UN Office of Disaster Risk Reduction (UNDRR)’s international webinar on the Sendai Framework entitled “Disability inclusive disaster risk reduction – still a tick marking exercise?” (UNDRR, 2022). Despite the leadership and increased awareness represented by international efforts, as noted in NRDC (n.d.), much resilience planning will occur at the subnational or local level, as planners at these levels may have the most specific knowledge of local hazards and local populations. In addition, direct policies and plans affecting locales are implemented at the local and subnational scales.

As the central goal of this research is to increase actionable PWD inclusion in Massachusetts climate resilience planning, the Methods section will identify the extent to which Massachusetts PWDs’ needs in climate resilience planning are already addressed by MVP and the municipalities. Should it be learned that these needs are not well addressed, research described

in the Methods section will focus on identifying solutions to meet these needs, including priorities and principles to guide that work.

3. METHODS

A variety of information sources were consulted to complement the literature review, to inform the goal of actionable inclusion of PWD needs in climate resilience planning at the state and local level in Massachusetts. The following research objectives shaped the research methods:

- Evaluating the extent to which MVP addresses the needs of PWDs;
- Determining the extent to which PWDs' needs are addressed in municipal level projects in response to guidance from MVP;
- Identifying the needs and planning priorities regarding PWDs in the context of climate hazards;
- Identifying principles that should guide PWD inclusion in MVP.

Four research methods were used: interviews with MVP and other Massachusetts government climate resilience planning officials; review of public documents associated with MVP, both current and from its initial development five years ago; interviews and information gathering with PWD experts as well as participating in weekly PWD working groups describing PWD-related difficulties arising from gaps between needs and services; and qualitative data analysis from each of these methods to see if it furthered one or more of the objectives above.

A key strategy from this project's inception should be noted, as it is presumed within the methods: to identify a single, central program that could reach many locales within Massachusetts, should program officials find increased inclusion appropriate. That program would then have the means to widely catalyze that change in many locales and disseminate the necessary resources, rather than the researcher attempting to make a case for change in each locale. A review of documents pertaining to the agencies and programs that work with climate resilience within the state led to a focus on investigating the Massachusetts Municipal

Vulnerability Preparedness program (MVP) as a possibly suitable program, as it offers guidance and resources to all municipalities in the state.

Research was conducted from August 15, 2021, through April 28, 2022. Due to pandemic restrictions, interviews were conducted remotely via the online chat platform Zoom, with follow-up via email, phone or text, per the preference of informants. Research focused on gaining information and perspectives from two groups of experts, both through formal interviews and less formal exchanges. The first group comprised officials in MVP and another Massachusetts state program. The second group from whom information was sought was PWDs themselves who were involved in community, national, and international disaster planning, for their expert opinions about best practices. Oral consent was obtained at the start of each interview.

Interviews with Massachusetts government resilience planning officials

A semi-structured, formal interview was conducted with the Greater Boston Regional Coordinator of MVP. During the initial interview, the researcher succinctly explained key points of what he had learned during the literature review and review of disability literature: that PWDs were actually a large percentage of the population, have a disproportionate death rate in climate emergencies, and often cannot access resources intended for all. He also offered resources including contacts with PWDs for direct input. At that point, the official stated that she and her colleagues were interested in acting on this. She also stated that there was a timely opportunity to make use of the offered resources and recommendations, as MVP would be revising its framework, including the materials that would be sent to municipalities, in 2022 as part of a five-year review. When asked who needed to give approval to this, she said it could be decided within the group of MVP officials, adding, “If we think it’s a good idea, we can just add it to the update”. At this point, MVP became the locus for the changes which the research project hoped to catalyze. The initial interview was followed by email exchanges, which are ongoing.

Additional information about MVP was obtained in the context of an environmental networking event for people affiliated with MVP, to get a sense of others' reactions to including increased disability access in planning. At that event, the researcher spoke to a regional coordinator for a Massachusetts region different from that of the official described above, as well as two professionals who had worked with MVP on their own municipality's MVP planning grant. They confirmed that they had not seen specific, actionable material focused on PWD needs in the settings or guidance they encountered. They expressed enthusiasm about the prospect, and their views and opinions aligned with those of the official who had been formally interviewed. The researcher also attended several webinars by MVP ("MVP Winter Webinar", "Massachusetts Climate Assessment Community Meeting"). Attendees had varied affiliations with MVP; municipal planners, subject specialists in areas such as rural infrastructure, and local disaster management professionals. During those webinars, the researcher discussed this project and asked multiple attendees about their experiences with accommodating the needs of PWDs. Again, the response was that actionable guidance or substantive mention of PWD needs was absent.

Semi-structured formal interviews were also conducted with three senior planning officials in a different Massachusetts government program. It was quickly determined that only MVP was an appropriate fit for the goals of this project, so only the single interview was held with staff from the other project.

Review of Public Documents Associated with MVP

A review was made of the programmatic documentation describing the submissions municipalities must supply in order to apply for planning grants, as well as criteria and guidelines for the plan itself. These are based on MVP's Framework which is, in practical terms,

the description of what each municipality's plan should cover. Strategies for community participation in defining and prioritizing problems were included in the Community Resilience Building Guide, another resource MVP sent to applicants. Toolkits, sent to offer guidance in various strategies, were also reviewed.

PWDs and their needs were generally absent from these documents, in contrast to attention regarding other vulnerable groups. A review was also made of a selection of completed plans by municipalities. In addition to providing information about the relationship between the MVP office and municipalities, all of these were searched for mentions of disabilities. Very few mentioned disability at all. Only one municipality had PWD inclusion throughout, that is, integrated throughout the different elements of the plan, with examples. The Findings section further details these.

The sources above answered all of the major research objectives. It was verified that there was no actionable mention of PWD needs on the MVP site, and only three of the municipal planning projects sampled or described by those associated with MVP were found to have any actionable PWD inclusion. This was confirmed by MVP's Greater Boston Regional Coordinator, as well as others associated with MVP during the networking event. The objective of determining the needs, planning priorities and principles that should guide PWD inclusion were identified through the PWD interviews described in this section. The most salient aspects of what was learned are described in Findings. When the consensus from PWDs was that an important element was missing, an optimal approach was developed, and these appear in the Recommendations section.

Interviews and information gathering with PWD experts

The second group of experts from whom information was sought was PWDs themselves, including those working professionally or as unpaid activists in areas related to climate hazards. These interviews and discussions contributed to meeting these research objectives: identification of the needs and planning priorities for PWDs in the context of climate hazards; as well as identification of the principles that should guide PWDs inclusion in the MVP

These interviews and discussions also provided first-hand experience of the impact of PWD accessibility being omitted from resilience planning; examples of government agencies at varied levels interacting with PWDs and each other in climate hazards; referrals to excellent PWD-created resources; and the inclusion of PWDs themselves respected the PWD demand that they speak for themselves. Their priorities and lived expertise have guided the research.

The knowledge and perspective of PWDs with expertise in climate resilience and disaster mitigation planning was obtained through several methods. A formal, semi-structured interview was conducted with a blind, long-time disability activist, who was regarded as a formal research subject; oral informed consent was obtained at the start of each interview. Questions primarily covered her experience as a disability advocate both in Massachusetts and nationally, including her perception of how local flood and storm events have affected PWDs and been responded to. She is also active in The Partnership, and SILVER (Saving Institutional Lives Via Emergency Relocation). The goal of the latter group is to ensure that PWDs who are displaced in a disaster are not rehomed permanently in a facility that restricts whatever degree of independence they are capable of, and which they experienced before displacement. Her personal perspective is that of a completely blind person, a world traveler who lives alone and independently in the community, but who would not be able to evacuate without support in an emergency.

This interview led to the interviewee inviting the researcher to attend weekly planning calls held by The Partnership. He has attended these, weekly, since January 25, 2022 through the time of the submission of this research project, and expects to continue doing so. The Partnership is a 501(c)(3), many of whose members hold high level roles in Federal agencies, (e.g., Department of Homeland Security; Federal Emergency Management Agency; Health and Department of Health and Human Services; and Centers for Disease Control and Prevention) or N.G.Os (e.g., Red Cross; World Institute on Disability; Independent Living Research Utilization; and the American Association of People with Disabilities) (Partnership for Inclusive Disaster Strategies, n.d.).

Interview with Marcie Roth, the founder and executive director of the World Institute on Disability (WID). The researcher interviewed Marcie Roth, who is the director of the World Institute on Disabilities and former Senior Advisor for Disability Issues at FEMA. She was asked about her experiences of disability inclusion in governmental programs, both in her governmental and NGO careers, as well as about what she saw as being best practices. She provided feedback about this project and the utility it might provide, as well as suggesting recommendations of additional authoritative sources to read. Significant interest was expressed about this project and its strategy, including mention that there needs to be more interaction between disability advocates and climate vulnerability groups.

Participation in Disability Advocacy in Climate Hazard Working Group Meetings

Those attending the calls convene weekly to discuss whatever issues of concern regarding PWDs in disasters have arisen during the week. It is noteworthy that they convene unofficially, that is, in general, they are not speaking in their official roles in the above entities. As explained, there is no official channel that allows such timely coordination across organizational boundaries, focused solely on solving a problem affecting PWDs, without the constraints they

would experience if acting in their official capacities. As such, the meetings are not recorded and the researcher has not cited anyone by name. The researcher's role is primarily that of a novice listening to experts, both in the sense of their lived expertise as PWDs, and in terms of professional skills. Subjects of calls listed in endnote 5.

Qualitative data analysis

Qualitative research data from each of these methods was analyzed to see if it furthered one or more objectives above. Data supported the conclusions that MVP was not currently including PWD needs in a way that resulted in specific plans, but that MVP was committed to moving forward this year on PWD inclusion. Information from PWDs was largely compiled to generate lists of needs, priorities, and principles. Additional attention was paid to topics and suggestions that came up repeatedly, or those which were proposed by acknowledged PWD leaders.

Corroboration of spoken information was obtained by checking with multiple sources. Information from the MVP official who was the primary contact was considered to be from the most authoritative source. In addition, her statements about MVP being willing to take concrete steps for PWD inclusions were confirmed by her follow-up emails stating that she had conferred with colleagues and was ready to proceed. The opinion that PWD inclusion would receive a favorable response was confirmed by the researcher soliciting the opinions of others associated with MVP during the environmental networking event and MVP webinars. Documents about MVP and its inception from the Mass.gov site or MVP site were assumed to be authoritative.

4. FINDINGS

The findings begin with discoveries related to the inclusion of the needs of people with disabilities in the MVP, as the focus of this research is to provide MVP with information and tools to improve in this regard. The latter sections address underlying considerations and difficulties that are widely applicable to PWD inclusion in planning for climate hazards and other emergencies, and will be of use to MVP as well.

4.1. The lack of inclusion of PWDs in the Massachusetts MVP program

The initial MVP plan, initiated in 2017-2018, refers especially to identifying, engaging and prioritizing people who are especially vulnerable to climate hazards. (Massachusetts MVP, 2017). However, MVP had not yet specifically addressed planning for disability issues as of early 2022. (As noted in the introduction, an MVP official interviewed for this project in early 2022 recently committed to doing so within the 2022 planning update.) Municipal officials replying to survey research (Vicarelli et al., 2021) mentioned PWDs as a vulnerable community they would like to include in resilience planning. However, as of the start of this research project, MVP had not yet been able to provide any specific resources and guidance for facilitating planning for PWDs' climate resilience needs, either as a group or differentiated by disability types. The widespread absence of information relating to addressing the needs of PWDs in most municipal climate resilience plans was confirmed within Massachusetts by the Greater Boston Regional Coordinator of the Massachusetts MVP program, who stated that no PWD-relevant information had been offered to municipalities.

A survey of the leadership of each of Massachusetts's 351 municipalities (Vicarelli et al., 2021), conducted four years after the MVP program began, found that while 75% considered PWDs to

be one of several groups vulnerable to climate change, only 26% had dedicated any resilience resources (defined as any needs assessments, planning or programs) to addressing the needs of PWDs in climate resilience planning. This was less than the percent who had dedicated such resources to the elderly or low-income residents. The percentage of those planning to specifically explore PWD needs in the future was also less than those with future plans to dedicate resources for the elderly or those with low incomes.

Examination of public records related to MVP, including documents sent to municipalities to aid in developing municipal plans, was undertaken to determine whether PWDs were omitted or included. There was only one mention of PWDs, without further detail, in a long list of vulnerable communities. That mention was of “people with disabilities”, an undifferentiated group; that is, there was no concrete mention that, for example, blindness might create different vulnerabilities and barriers than being a wheelchair user. A review was also made of a selection of completed plans by municipalities. In addition to providing information about the relationship between the MVP office and municipalities, all of these were searched for mentions of disabilities. Very few mentioned disability at all; again, these were generally mentioned as one of a list of vulnerable populations, without examples, further descriptions of vulnerability in different climate emergencies, or operationalized guidance. Only one municipality had PWD inclusion integrated throughout the different elements of the plan, with examples.

However, mentioning people with disabilities is not useful by itself. More importantly, none of the guidance identifies different kinds of disabilities or functional limits. Research (Aryankhesal, 2018; Roth, 2020; Weibgen, 2015) indicates that lack of inclusive planning can create barriers to accessing resilience resources meant for all. The identification of such barriers, which differ by disability types or functional limits, can inform plans to remove those barriers, enabling equal

access to life-saving public resources. These research findings are further discussed in section 4.2 and 4.5.

MVP-provided materials for locales lack specific, actionable guidance on PWD needs

Without guidance about specific actions that successfully include PWDs in developing local climate resilience plans, it is very difficult to act on the imperative to include every resident in the plan. In the MVP guidance for municipalities about how to plan appropriately for the specific needs of vulnerable groups, there is very little specific information for municipalities about how to include and plan appropriately for PWDs, such as identifying and removing PWD-specific barriers to accessing public emergency resources (e.g. evacuation vehicles inaccessible to wheelchair users; evacuation warnings inaudible to the Deaf; evacuation maps inaccessible to the blind). Also needed, and absent, is guidance on such planning processes as: executing needs assessments that are accessible to all; removing barriers to input in planning sessions; and identifying individuals and groups at highest risk of death; choosing communications methods accessible to the entire population, including those with limits in hearing, seeing, and cognition. These omissions are likely to drive the disproportionately high death rates of PWDs in climate emergencies.

PWDs inadvertently omitted from inclusive outreach efforts in early MVP community planning

Extensive efforts were made from the beginning of MVP to ensure diversity, and to reach multiple stakeholders, including those who were most vulnerable. Specific activities were suggested to include members of other groups experiencing vulnerability due to societal or environmental factors. However, PWDs and their needs were almost completely absent from these documents, in contrast to attention regarding other vulnerable groups.

MVP started in 2017. One of the earliest (2017-2018) government documents about MVP, publicly available online, conveys its commitment to equity most clearly in its URL: “MAPC (Massachusetts Area Planning) Council Equity and Climate Planning MVP webinar”. (The title page simply states “Municipal Vulnerability Preparedness [MVP]”). This seminar described a long list of groups vulnerable to climate change and needing extra consideration: people living in poverty, children, adolescents, pregnant people, elderly people, members of disadvantaged racial minorities, people who do not speak English as a first language, immigrants, those living in “heat islands”, and outdoor workers. (MVP, 2017).

For many of these groups, details included specific ways they were vulnerable to climate change phenomena, with operationalized suggestions about steps to take to offset those threats. Case studies, photos, and examples were given for most or all of these. Inclusive efforts described the need to do proactive outreach with attention to diversity of race, religion, income level, job status, whether English was the primary language, having less than a high school degree, and immigration status. Disability was not mentioned among these. Specific guidance was given about the need for both interpreters and translation of documents for people for whom English was not a first language, but there was no mention of modifications needed to reach blind or Deaf people. Organizers were urged to go where the community was rather than expecting residents to reach out themselves, and practical suggestions were given about settings where this group was likely to be able to attend, but there was no mention of PWDs, for whom mobility and navigation can be very difficult. There were suggestions about overcoming barriers to inclusion in the case of poverty and not being fluent in English, but again, there was no mention of PWDs. A great deal of guidance was given about how to make sure all attendees were comfortable and able to participate, but there was no mention of making sure the site was disability accessible or had accessible bathrooms. There was a single mention of “people with disabilities”, in a list of other vulnerable groups, but with no examples, outreach suggestions,

modifications to make participation possible, case studies, or descriptions of how climate resilience was an issue for PWDs (Community Resilience Building, n.d.; Massachusetts Executive Office of Energy and Environmental Affairs, 2021; Massachusetts Municipal Vulnerability Preparedness Program, 2017).

The MVP Environmental Justice Equity toolkit was searched to see how many instances of a given vulnerable group were mentioned. Racial inequality was mentioned 12 times; income inequality 9 times; limited English proficiency, 8 times. By contrast, there was only a single mention of disability in any capacity, in a sentence that contains "income level, disability, racial inequity, health status, or age" (Massachusetts Executive Office of Energy and Environmental Affairs 2021).

This Equity and Inclusion document lists seven “MVP Ensuring Success Webinars”. Three out of the seven address these issues: “Advancing Social Equity in Climate Adaptation Planning”; “Alternatives for Engaging Your Community” ; and “The Importance of Listening”. The document includes the “ Engagement Strategy Chart” developed by the Metropolitan Area Planning Council in 2017, which suggests many outreach activities to ensure equity, including focus groups, surveys/polling, public meetings, community mapping, visioning workshops, open houses, resident advisory committees, participatory decision-making, and resident juries.. It suggests that care be taken that these public activities ensure diversity of race, gender, English proficiency, and religion. It describes “Best Practices to Ensure Diverse Participation” and “Equity in Climate Planning-Case Studies”. Yet somehow, PWDs were not discussed.

Given the evident commitment to equity and diversity, that PWDs were not included suggests a deeply rooted oversight of this important, and vulnerable, group. This stage in the process was intended to be a “community-driven process, rich with information, experience, and dialogue,

where participants identify top hazards, current strengths, challenges, and priority actions to improve community resilience for all hazards today, and in the future." It appears to have been intended that priorities and concerns be initially outlined at that time: functionally speaking, a "To Do" list. Regardless of how this omission originally happened, it may be that if a community's voices and concerns were not included in those original planning sessions, nor previously a conscious concern on the part of the toolkit creators, once a community's specific concerns were omitted from the initial planning, that omission perpetuated itself.

4.2. Possible reasons for lack of specific planning for PWD needs

The following reasons underlying a common lack of specific planning for PWDs' access needs in emergency services are probably not limited to any locale or nation. Awareness of these possible underlying causes, and their inclusion in planners' training, may be beneficial to MVP, as well as other resilience planners.

Lack of awareness that PWD-inclusion can be life-saving

That PWDs have a four-fold greater death rate in disasters than the non-disabled is not in dispute (Calgaro, 2021). This is not due to biological vulnerability– and not taking this into account can impede prioritizing inclusive planning. As a former FEMA Disability Director[4] said in her written testimony to the July, 2020 House committee meeting on "Experiences of Vulnerable Populations During Disaster":

"Having a disability does not make people more vulnerable in disasters. Everyone is potentially vulnerable to the impacts of disasters. What makes people vulnerable is the failure [of] communities and governments to plan for the inclusion of people with disabilities in every aspect of the disaster cycle, including community preparedness and disaster exercises, accessible

alerts and warnings, building and community evacuation, sheltering and temporary housing, access to health maintenance and medical services, and all aspects of the recovery process" (Roth, 2020). This is borne out by a research study on disability and earthquakes which concluded "The sudden death of people with disabilities during disasters is preventable through proper planning and preparedness of emergency personnel. Hence, identifying the safety needs of these people and inclusion of such plans in disasters management systems can assure safety for people with disabilities during disasters" (Aryankhesal, 2018). Additionally, an article in the Yale Law Journal (Weibgen, 2015) discussed the recently recognized "right to be rescued", described as "a legal right to have [PWDs'] unique needs accounted for and addressed in emergency planning". The legal designation of this right grew out of a successful class action suit against the City of New York after Hurricane Sandy, in which the court held that the City of New York failed to ensure that PWDs have meaningful access to the City's emergency services equal to that of other residents. How one attributes the disproportionately greater deaths of PWDs in emergencies has an impact on whether or not inclusive planning is seen as workable, lifesaving, and a civic duty. If it were assumed that PWDs were going to die anyway due to some inherent vulnerability, there would be less motivation to plan to ensure they can access publicly available services in emergencies.

Lack of awareness that PWD resilience needs are specific, requiring advanced planning

It is possible that this lack of awareness might be related to underestimating the complexity of PWD resilience needs, the specificity of different disability needs, the unique considerations distinguishing them from other climate-vulnerable groups, and therefore the necessity of prior planning rather than improvising during emergencies. An example of the need to plan well in advance to overcome specific barriers to PWD inclusion occurred in 2017, with the imminent arrival of Hurricane Irma to Florida. The Governor had made no advanced plans to find an expert American Sign Language signer. For an urgent evacuation order, the Governor's office gave the responsibility to sign the alert to a non-Deaf staff member with no ASL expertise besides signing with his family. His attempts at signing the evacuation order, described later by … as "gibberish", included "pizza", "monster", and "help you at that time to use bear hug". The Deaf and other disability communities were outraged (Caron, 2017).

Rather than "special needs", PWDs need inclusive planning to allow them to access resources "everyone needs"

A major reason for focusing on PWDs' needs rather than their diagnosis is simply that without planning specific to their needs, focused on removing barriers to their access to resources, they will be unable to access standard resources, leading directly to disproportionate death rates. Many needs of other non-disabled vulnerable groups are already met, because those needs are taken for granted. When emergencies require evacuations, it is generally understood that few people can rapidly walk many miles, so transportation is provided as a matter of course for those without. It is generally understood that everyone requires updates on situations that could lead to evacuation, and that it would be unreasonable for everyone to have to seek this information for themselves, so public announcements are made as a matter of course. These life-saving resources are available to most segments of the public. It is often taken for granted that everyone can access these resources: that everyone can climb the steps to a bus, and that everyone can hear, read, and understand public emergency announcements. However, many people with disabilities cannot access these resources. Specific planning for PWDs' needs is required for them to simply have equal access to resources intended for the entire public.

Lack of awareness of existing literature and resources on PWD inclusivity in disaster planning

In the survey of Massachusetts mayors and municipal leaders described above (Vicarelli et al., 2021), it was clear that these officials felt overwhelmed by the number of climate hazards affecting their municipality, and took seriously their obligation to the residents, but felt essentially powerless to make a difference. Given that 75% stated that they perceived PWDs to be vulnerable to climate hazards, but only 26% had participated in even minimal related planning, it is plausible that the gap occurs because they simply don't have more time or resources to think about a new facet of the climate problem. But the necessary planning already exists, done by

PWDs who have focused on climate hazards and disasters. (Please see Resources, Appendix 3.) The information already exists but it often doesn't surface among conventional planning resources or might just be ignored.

4.3. Differentiation of PWD needs in climate resilience planning

Description of PWDs as undifferentiated “people with disabilities” is not sufficient for planning

When PWDs are mentioned in MVP guidance, it is as if they were a homogeneous group rather than a heterogeneous, diverse population. “People with disabilities” might include “people with vision and hearing loss, physical disabilities, speech disability, mental health disabilities, developmental and other cognitive disabilities, behavioral health issues”, and “cross-disability access issues (hearing, vision, mobility, speech, and cognitive limitations)” (Kailes, 2014).

Within-category distinctions more needed for PWDs than many other vulnerable groups

Considering how little overlap there is among the needs of people with the conditions just named, more within-category differentiation may well be needed for PWDs than for other categories of vulnerability, such as people living in poverty. Ignoring such differences has “led to vague planning for physical access and effective communication and programmatic (services and accommodations) access. This practice resulted in “response failures” (Kailes, 2020), that is, inability to provide life-saving help to PWDs in climate emergencies. Specificity about needs is required to “provide specific guidance for operationalizing tasks required for effective and appropriate preparedness, planning and response” (Kailes, 2020). Effective planning depends on a thorough needs assessment. That, in turn, depends on carefully describing who the planning aims to help. Difficulties in identifying an appropriate system of description are described in the next section.

4.4. Problems in description of disability types and functional limits

Some means of classifying categories of disabilities or functional limits of PWDs is necessary in needs assessment for climate resilience planning. Other reasons for classification of functional limits exist but vary, depending on the goal of the exercise. In the case of climate resilience planning, the goal is to understand what barriers to accessing resilience resources exist, so that the barriers can be removed. It would be preferable to use a classification system that already exists, has been field-tested, is widely accepted, and suits the functional purpose to which it is applied. However, no existing system is appropriate for this purpose.

Limits of currently used systems to describe disabilities and functional limits

The three most commonly used systems to describe people's disabilities are: medical diagnoses, the classifications used in the US Census, and the International Classification of Functioning, Disability and Health (ICF). None is suitable for climate resilience planning.

Arguments against using medical diagnostic categories

Kailes (2020) makes a valuable point in strongly opposing the use of diagnostic categories in planning for people's needs during climate emergencies. She correctly states that these categories do not provide the information needed to describe a person's functional limits, that is, what they can and cannot do, as it applies to interacting with existing systems.

Two people with very different diagnoses might well have the same functional limit. For example, of two people who cannot climb steps, one might be a medically healthy person with severe ankle damage, the other might have breathing problems. Both might need help evacuating if power fails and elevators cease operating, but only the latter would need medical supervision. Conversely, two people with the same diagnosis might have very different

functional limits, such as two people with rheumatoid arthritis, one of whom can climb steps if they need to evacuate without assistance, the other of whom is too debilitated to do so. These distinctions are key to what a person needs to know to plan means of evacuation or shelter facilities.

Limits of US Census disability classification

In the U.S., the most widely used classification system for disabilities at the population level is taken from the US Census, which is also used in the Centers for Disease Control public education pages. This system has too few categories, reducing the wide variety of disabilities to six categories: difficulties in ambulation, cognition, hearing, vision, independent living, and self-care. The first four categories give a qualitative description of functional limits, that is, they provide information about what kind of limits the person has. The latter two categories give no information about why those who have trouble with independent living and/or self-care have those problems. Are they experiencing cognitive limits? Are they medically fragile? Can they see, hear, and ambulate? Effectively, then, there are only four categories, which is not sufficient for describing the disparate abilities and disabilities of diverse people.

Another significant problem with the Census model is there is no mention of the degree of the difficulty a PWD has. This provides insufficient information for assessing the vulnerabilities of people with these disabilities in a climate hazard situation. For example, a person who has ambulation difficulties but can walk with crutches or a cane can still evacuate a building in an emergency despite non-functioning elevators, while a person whose ambulation requires a powered wheelchair is unlikely to be able to evacuate without assistance.

The categories in the American Community Survey, another tool previously used in the US Census, are equally inappropriate The categories used in 2014 and 2018 mix together degrees of impediment. A single question asks whether the respondent uses “a wheelchair, a cane, crutches, or a walker”; the only answer is “Yes” or “No”. The system also mixes together qualitatively different impediments, asking whether the respondent has “a learning disability, cerebral palsy… Alzheimer’s disease, [is] blind…or deaf or [has] some other type of …emotional condition” (US Census Bureau, n.d.). This mixing of disparate disability categories would make this system inappropriate for climate disaster planning.

International Classification of Functioning, Disability and Health (ICF)

The International Classification of Functioning, Disability and Health (ICF) is at the other extreme; its specificity is too great to be useful in accessibility planning, with distinct codes for specific medical diagnosis, the situation in which it arose, and the number of times it has occurred. For example, there is a specific code for what activity a person was engaged in the second time they broke their left leg. More importantly, it does not describe the functional limit of the condition. It is intended for use in a medical care context, as well as in insurance claims and epidemiology (National Center for Health Statistics, 2021).

Distinctions needed in a classification system usable in climate resilience planning

As stated above, there is, unfortunately, no widely used classification system that is appropriate for describing a person's functional limits in the context of accessibility in climate resilience planning. As such, it is important to describe what is useful and what is to be avoided in whatever system is put in place. First, the functional degree of disability should be included. Omitting the functional degree of ability and disability can cause problems either from overestimating or underestimating the extent of needs and vulnerability a PWD has in a climate emergency. Underestimating needs and vulnerability may lead to insufficient planning that could be fatal. A prominent example is when buses and other vehicles meant to evacuate people from Hurricane Katrina were not equipped for people with mobility issues. As a result, some people were left behind, and others were forced to abandon the (extremely expensive, custom) equipment which was crucial for physical safety, mobility, communication and autonomy (Shapiro. 2005).

Conversely, overestimating needs and vulnerability– or not acknowledging the harm of unnecessary restriction– can lead to a demeaning experience and diminishing the person's

autonomy. After evacuations or loss of housing due to disaster, PWDs who had been living independently and were capable of continuing to do so are often permanently rehoused in excessively restrictive environments, such as nursing homes. This is contrary to a provision of the Americans with Disabilities Act referred to as “Least Restrictive Environment”. In addition, congregate housing during a pandemic is dangerous. This inappropriate, permanent placement is being fought by disability activists in Massachusetts and throughout the US, via local chapters of groups such as SILVER (Saving Institutional Lives Via Emergency Relocation) among others. Excessively restrictive placement was the topic of a special report by the National Council on Disability, an independent federal agency charged with advising the President, Congress, and other federal agencies (NCD, 2019). The title of the report, “Preserving Our Freedom: Ending Institutionalization of People with Disabilities During and After Disasters”, communicates how this is perceived by PWDs: not “undesirable housing” but possibly permanent loss of freedom.

Well-intentioned euphemisms about functional degree of disability can contribute to planning problems as well. Euphemistic language can obscure the degree of need, communicating a false impression of the degree of impediment. This complaint was made by a disability activist who is completely blind. She emphatically rejects being categorized as having a “visual difficulty” or similar. She states that in an emergency situation, “A person who is visually impaired will need navigation support. An individual who is blind will need navigation assistance. And a group of persons who are blind will need navigational support” (personal communication, 2022). The goal is to provide neither more nor less assistance than is needed. To do this requires specificity about level and type of functional ability.

Several papers from disability activists and disability-aware emergency planners have offered valuable perspectives on the broad questions of how to classify and describe PWDs’ needs in a climate emergency context, as well as suggesting elements that need to be included (numerous

references). However, none offers a classification system as such. Many of their ideas and proposals have been incorporated in the prototype matrix resulting from this research project.

Describing functional limits rather than diagnosis often yields better information

Kailes (2007 & 2020), rejects any model that is based on a diagnostic label, as noted above. She argues, first, that diagnosis does not accurately describe what the person is capable of, or needs. She also rejects the phrase “special needs”, which provides little information and is also seen as demeaning. She calls for a better framework, based on these essential function-based needs: communication; maintaining health; independence; support, safety and self-determination; and transportation. This functional orientation is the first one encountered by this researcher in the literature that appears suited to defining the functional needs of PWDs in a climate emergency situation. Another strength is its acknowledgment that needs will change as a result of the type of emergency as well as the type of disability. However, on closer reading, this “framework” is more effective as a mnemonic for considering categories of functional need, and would most useful as a guide to assessing an individual’s needs in depth, rather than a way to group people with similar kinds and degrees of functional limits, such as “people who cannot use stairs, even in an emergency”, which would be valuable for a resilience planner to know. However, Kailes provides many useful, very specific examples about the intersection between an individual’s disability and the type of emergency. For example, she points out that anyone who depends on oxygen, a breathing apparatus, or home dialysis cannot shelter in place, and will be in an acute, emergency situation in a power failure.

Replacing diagnosis with functional limits, personal and environmental factors

Gaskin (2017) describes factors associated with climate change vulnerability that are quite different from a medical model of disability. All of these would contribute to a full picture of an individual PWD’s vulnerability:

> “personal factors (e.g., female gender, uncoupled or living alone, nonwhite ethnicity, and low income), environmental factors (commonly, limited practical support from government agencies and disability organizations), bodily impairments (cognitive impairments, hearing impairments, progression of impairments, relapse/exacerbation of symptoms, and thermoregulation difficulties), and activity limitations and participation restrictions (limited preparedness, difficulties with evacuation, and difficulties reassembling individual accommodations and repairing or replacing adaptive equipment).”

These are particularly valuable in that they emphasize the intersection between the person and the environment, rather than identifying vulnerability as simply as a fixed quantity, residing in the person, solely determined by the disability. Gaskin also emphasizes “adaptive capacity” and personal preparedness. She states the need for more research on factors that support PWDs’ adaptive capacity, rather than just vulnerability.

All the above perspectives on what is important in describing disabilities and functional limits are valuable in critiquing existing systems or describing what is needed instead. However, they do not yet add up to an alternative.

Therefore, for the purpose of this project, terms have been assembled from different sources. They primarily describe the functional limit that points to access needs in an emergency. However, some diagnoses and medical conditions also give useful information regarding needs in a climate emergency, as they interact with specific climate hazards. For example, people with spinal cord injuries have trouble regulating their body temperature, so knowing this diagnosis would indicate that such people should be prioritized for cooling in a heat emergency.

Please see “Development of a Prototype Matrix” (Appendix 4).

Choice of terms for describing disability communicate perceptions of disability

The section above describes practical limits of different ways of classifying disabilities. A different set of distinctions about the terminology used to describe disabilities arises from ways of perceiving disability: a difficulty arising from the person’s body; from an inaccessible environment, not the person’s body; or from the interaction of body and environment. A person who is not disabled may regard certain descriptions as simply objective, while for many PWDs,. the choice of language touches on matters of pride, respect and autonomy. As with other activist movements that work for justice and equity, the disability rights movement has focused attention on how different terms connote autonomy vs. dependence; abilities vs. disabilities; rights vs. favors. Some reject the term “disability” itself. And as with other justice and equity movements, it is important to know what terminology a disenfranchised group regards as respectful.

Different models or perceptions of “disabilities”

The three major models, or ways of regarding disability, are the medical, social, and critical realist. The choice of language used, which may seem to be simply accepted terminology, can have the unintentional effect of implicitly attributing disability to the person, the built environment, or an interaction.

Medical model: This model, based on diagnosis, regards disability as fixed, and located in the individual. There is no assessment of a person’s resources, strengths, or adaptive capacity. An example would be, “This paraplegic has to use a wheelchair”. This language, unconsciously or not, identifies the person with paraplegia solely in terms of that condition, almost as if person and condition were identical. In addition, saying someone “has to” use a wheelchair implies that

the chair limits them, rather than providing them freedom of movement.This language is seen by many PWD activists as inherently belittling. In addition, by omitting the question of whether the built and social environments are disability-inclusive, this model has the effect of absolving society of playing any role in whether a physical limit has to be a limit in life.

Social model. Conversely, the social model identifies disability as arising from structural inaccessibility (environmental features that disable, and discrimination), rather than residing in the body. For example, Judith E. Heumann was refused a New York City teaching license solely due to her wheelchair usage, and had to appeal to the United States District Court for this discrimination to end. Heumann, who became the Assistant Secretary of Education under President Clinton, said, “Disability only becomes a tragedy for me when society fails to provide the things we need to lead our lives—job opportunities or barrier-free buildings, for example. It is not a tragedy to me that I’m living in a wheelchair” (Polio Place, n.d.) Countering the notion that it’s unrealistic to locate responsibility within an inaccessible environment, consider this: The average US female, age 20 and up, is 5’4” tall, making the top shelf of many grocery stores inaccessible (Cleveland Clinic, n.d.). This is clearly an inaccessible-environment problem, not “height deficiency” in half or more of US women. By analogy, lack of curb cuts, ramps and wheelchair lifts can be seen as a design failure of the built environment, not a problem with the body of the wheelchair user.

Critical realist model. The recently-proposed, third model of disability includes aspects of both a medical and social model, arguing “people are disabled by society and by their bodies” (emphasis added) (Shakespeare, 2013). This model or viewpoint achieves two goals which may otherwise seem to conflict. It identifies specific functional limits, which is necessary for climate threat preparedness. At the same time, it identifies relevant strengths and potentials, which is a key element in personal preparedness and respect, as well as a practical necessity in avoiding providing either too much help, or too little. The work of Kailes (2007 & 2020) could be seen as an excellent example of a critical realist approach, whether or not she identifies herself that way. Her C-MIST model for a flexible planning and response framework adds a great deal to the description of functional needs in emergency planning.

4.5. Inclusive services and communications can save lives of people with functional limits who do not describe themselves as disabled

Many people who do not identify themselves as disabled have a functional limit that could be life-threatening in a climate emergency. They may not identify themselves as disabled because of stigma (Oregon State University, August 28, 2017). For others, their education and type of work allow them to make their own arrangements without work or school accommodations, or disability insurance. Some limitations in mobility, sight or hearing develop so slowly with aging that the individual may be unaware of their magnitude until an emergency arises and their usual support network fails. Many do not experience their physical limits as functional limits until normal infrastructure fails (e.g., outages affecting elevators, public transit, or personal digital devices that enlarge text). In addition, in a disaster it is more likely that people will lose or break hearing aids or eyeglasses. All these people can benefit from communications that can be accessed without perfect hearing and sight, and from evacuation procedures that can be accessed despite physical and sensory limits. These are often referred to as examples of

Universal Design, that is, design that is created from the start with the understanding that those who interact with it will have wide variations in needs, usage patterns, tasks, abilities and disabilities. Designing this way from the beginning can save money and time, rather than having to retro-fit as different needs become apparent. In addition, it allows people with different needs to interact with the same public setting as others, in a way that does not cause them to separate themselves from the group to access services they need. For all these reasons, Universal Design should be more widely used, especially in public buildings.

4.6. Slow-onset climate hazards are less planned for than sudden-onset emergencies

In Gaskin's extensive review of studies of disability in the context of climate danger in the US (Gaskin, 2017), she notes that "most studies focused on natural disasters (or emergency preparedness for such events)". She calls for studies of PWDs' vulnerability and adaptive capacity in slow-onset "events potentially related to climate change". These include sea-level rise and increased temperatures. In reviewing the literature for this project, the same gap was noted. Although climate hazard was described in terms of both slow-onset hazards and sudden-onset emergencies, nothing was found about PWDs in the former, except for research about the increase of infectious disease in the Global South due to rising temperatures. Despite the certainty of sea level rise and increasing temperatures, it was comparatively harder to find anything about resilience planning for any people with regard to slow-onset hazards as opposed to sudden-onset emergencies. This may be because hurricanes and similar disasters receive more attention in the news and public awareness, and thus are more likely to be addressed by government policy. In any case, there is also a great need to understand and plan for slow-onset climate events in regard to PWDs.

4.7. Failure to learn from mishandled emergencies is common

A legal study of PWDs' de facto equal access to emergency services as guaranteed under the Americans with Disabilities Act concluded "the same access mistakes appear to be made repeatedly in disaster management activities" and "lessons learned after a disaster about reducing access barriers are not subsequently integrated into common practice" (Grady & Andrew, 2007). During Hurricane Katrina, there were avoidable deaths of PWDs greatly disproportionate to the deaths of the general population. Congressional testimony was given about the failed attempt by a Federal official, over the course of three days, to evacuate a quadriplegic woman who drowned in her wheelchair (Roth, 2010). All of this led to a mandate to "integrate the needs of people with disabilities and those with access and functional needs, into general emergency management planning, response and recovery", the federal Post-Katrina Emergency Management Reform Act of 2006. At some earlier date, it might have been plausible that those in charge of planning simply had not been aware of PWDs' needs to access emergency services intended for all. But despite the Katrina disaster and the subsequent Reform Act, during the 2008 Hurricanes Gustav in Louisiana and Ike in Texas, there was the same lack of PWD access to basic services intended for all: "Many people [with disabilities] were still turned away from shelters, information was inaccessible to individuals who were deaf or blind …and catastrophic but preventable health impacts were felt by previously stable and independent evacuees with disabilities" (Roth, 2010). It is always a tragedy when life is lost because of failures by those charged with protecting such people. But when knowledge of how to prevent such recurrences is ignored, and won at the cost of lives lost, failing to make use of this knowledge is hard to justify.

The following applies to agencies and programs at varied levels of government charged with public safety, from the Federal to the state level. This does <u>not</u> apply to MVP in particular, but

may be useful for MVP planners to know when engaging with partner agencies and programs which are charged with public safety. A series of recent legal cases point towards a “right to be rescued”, that is, PWDs have “a legal right to have their unique needs accounted for and addressed in emergency planning” (Weibgen, 2015). In one major case, Brooklyn Center for Independence of the Disabled (BCID) v. Bloomberg, the court found that PWDs had legal standing to bring a lawsuit simply on the basis of the absence of adequate, specific planning to provide equal access to emergency resources, whether or not they had been personally harmed. After many years in which the City had failed to act on recommendations of its own advisory groups, “the plaintiffs successfully argued that the City’s *failure to provide an adequate emergency plan* that expressly included PWDs *was* the harm” [*emphasis added*]. Ruling in the plaintiffs’ favor, the Court stated that it was not appropriate to require PWDs to wait to be harmed when it was clear that the absence of appropriate planning would predictably result in harm. Upon having the lawsuit decided in their favor, the plaintiffs did not ask for any monetary damages; instead, they requested that adequate, specific, actionable plans be developed. These have been described as “the most comprehensive disability disaster plans that now exist in the country”. (Weibgen, 2015).

It is evident in the research literature on PWDs and disaster planning that the hard-earned lessons after mishandled disasters do not always get incorporated into recommendations which could improve planning and save lives. This applies to guidelines developed after hurricanes, best practices, case studies, and accounts from the disability communities and researchers. Though resource limitations always influence policy decisions, the fact that PWDs experience four-fold higher death rates in climate disasters shows that additional work will need to be done simply to create parity with the non-disabled. However, there is no need for resilience planners to start from scratch. There is a wealth of information available from PWDs who work in resilience planning, disaster planning, or public safety. Resilience planners should be directed to

these sources, such as The Partnership for Inclusive Disaster Strategies, and exemplary materials offered without charge by June Isaacson Kailes. (Please see Resources, Appendix 3.)

4.8. Periodic updates in planning needed

A final omission in resilience and disability planning is that a priori plans for updates are seldom included. June I. Kailes (2020) describes her original C-MIST Framework (2007) being adopted by FEMA, but when she tried to apply her 2020 updated Framework to incorporate the latest disaster research and practice, she was told that this was not what FEMA used. Her protest that, as the author, she was including updated information, was insufficient; there was no arrangement to permit updates.

Updates can be urgently required by changes in world events. Before early 2020, few people beyond epidemiologists had given thought to the impact contagious illness would have on responses to environmental hazards. It rapidly became clear that evacuations during a pandemic could have life-threatening consequences for infectious disease transmission, especially if they resulted in congregate housing placement. Yet in the course of this research, almost two years after the beginning of the Covid pandemic, the literature remains absent of papers that connect this issue to that of climate resilience and climate hazards

In this respect, the Massachusetts MVP has shown forward thinking in having planned for a 2.0 update five years after the program was launched. This will not only allow additional attention to groups who experience additional climate vulnerability as a result of general inequity, it will also allow new findings about climate change to be incorporated, as well as best practices elsewhere.

While recommendations in this report can be presumed to be up to date at the time of publication, this cannot be presumed to continue without a firm expectation for periodic reassessment and potential expansion of knowledge, based on new developments and new awareness of the needs of the PWD community, as well as learning empirically what has and has not worked. The initial prototype matrix presented as part of this project (Appendix 4) should also be revisited periodically.

The development of a comprehensive, municipal-focused framework suitable for approaching full inclusion of PWD needs in climate resilience planning would be a valuable resource. It should include specific, actionable information for municipalities about how to include and plan appropriately for PWDs, including identifying and removing PWD-specific barriers to accessing public emergency resources (e.g., evacuation vehicles inaccessible to wheelchair users; evacuation warnings inaudible to the Deaf; evacuation maps inaccessible to the blind). Also needed, and absent, is guidance on such planning processes as: executing needs assessments that are accessible to all; removing barriers to input in planning sessions; and choosing communications methods accessible to the entire population, including those with limits in hearing, seeing, and cognition. Finally, special attention needs to be given to identifying individuals and groups at highest risk of death; these omissions are likely to drive the disproportionately high death rates of PWDs in climate emergencies. These are developed in the Recommendations section, with related Resources (Appendix 3).

5. RECOMMENDATIONS FOR MVP AND MUNICIPALITIES

This next section translates into action items the gaps and needs described throughout this paper. MVP should prioritize recommendations in the following areas during their current five-year review:

- Incorporate the needs and voices of PWDs with varied functional limits or disabilities into the planning processes of MVP and municipalities;
- The means by which MVP can effectively deliver their guidance and resources to appropriate city and town planners;
- An overview of areas that municipalities need to include in regard to PWDs and climate resilience planning and climate emergency response implementation.

Resources for implementing the recommendations below are in **Appendix 3**, especially those from: the Partnership for Inclusive Disaster Planning; the World Institute on Disability; and June Isaacson Kailes. Both organizations and Ms. Kailes offer professional services to create customized plans for organizations and agencies.

5.1. Incorporating the needs and voices of PWDs into the MVP's ***and*** municipalities' planning processes

It is important that PWDs be included in all applicable areas of general planning documents when describing goals and objectives. They should be identified as populations who are vulnerable to climate change and severe climate change-related events, and who require specific planning to

remove barriers to accessing publicly available resilience and emergency services. Examples include barriers to receiving emergency information for those who are blind or Deaf; barriers to following an evacuation order for those who are mobility impaired; or simply barriers to attending community planning workshops which are not accessible to any of the above. It should be made clear to all the professionals concerned that what is called for is equal access, not “special needs”, and that planning which enables such access can decrease PWDs’ disproportionate death rate in climate emergencies.

At every stage of planning, from needs assessments onward, efforts should refer to varied, specific impairments or functional limits rather than only “People with Disabilities”. That language can mislead planners into thinking of them as a homogeneous group. Use best practices in description of disability types and functional limits.

Planners should engage experts and activists on accessibility, including PWDs themselves, in planning and implementation, including drills and table-top exercises, then incorporate their recommendations into the work of MVP and their municipal partners. Whenever possible, proposed activities and strategies should be tested by users/experts with qualitatively different disabilities and functional limits. Furthermore, in the same way in which outreach to an immigrant community regards that community’s lived expertise as valuable guidance, non-disabled professionals should give great weight to guidance from PWDs including those with professional experience in planning for climate hazards. There are disability-led organizations which will consult with any entity to create PWD-inclusive plans; a partial list is found in Resources, Appendix 3. There is also a wealth of material in that Appendix by PWD disaster professionals. Planners should include, by active outreach, PWDs with different types and degrees of disability and limits. For example, a blind person with complete mobility has little to contribute to understanding the needs of a wheelchair user. Consider the intersections between

disabilities and other factors, such as race, poverty, degree of education, literacy, digital access, digital fluency, availability of assistive devices.

For full participation in community planning, these events must be completely accessible to people with varied functional limits. There are too many aspects of accessibility to name here; please consult resources in Appendix 3. A good place to start would be Kailes, 2020b and 2021. Lack of PWD attendance at such workshops, due to access barriers, may lead to the false perception that there is no unmet need. There are now free, user-friendly tools allowing every digital communication to be completely accessible. However, as PWDs are disproportionately more likely to live in poverty, do not assume that all have full digital access and skill.

5.2. How and where MVP could incorporate PWD concerns within its existing program structures

During the Grant Process

PWD-relevant guidance should be incorporated in the main sections of guidance for municipalities applying for Planning and Implementation grants. Funding application materials should include specific examples of addressing PWD needs to spark inclusion into individual grant applications. This should help details from proposals to flow naturally into later stages of planning or implementation work by municipalities.

MVP Framework: In depth planning and operational toolkit

Add a section on planning for PWD inclusion in MVP's climate resilience planning tools. This could be under the Equity Toolkit section.

MVP "Certified Providers"

Delivering material to the Certified Providers will be critical, for two reasons: as the technical and subject-matter experts, they are a very important source of guidance when a municipality is actually writing and refining its proposals; but in addition, for many of them, very little in their extensive scientific and technical education will have included the information and concepts relevant to PWD inclusion. It would also be beneficial for them to be exposed to a few PWDs with different types of limits explaining how access barriers might prevent them from accessing life-saving resources in an emergency. This could be done via a live panel, or pre-recorded.

Peer-to-peer assistance

Identify and support peer-to-peer assistance by municipalities which have already found good solutions for PWD inclusion in their planning. This might feel especially "relatable" to municipalities during proposal development. Appendix 1 includes links to the entire plans of municipalities with useful PWD inclusion. Appendix 2 refers to specific PWD-relevant components of plans by municipalities. Note that two municipalities have developed good models of support for PWDs who are at high risk of illness or death during power outages. These include partnerships with first responders and other resources,through MVP's robust peer-to-peer framework for municipalities, specifically encouraging and supporting resource sharing via**:** webinars; posting of exemplary grant proposals; shared plans; and examples of tools such as local newsletters.

PWD inclusion on equity council beneficial, but any one PWD limited in expertise

It's great that a PWD will be included on the Equity Council. This is an important step forward. Should further suggestions about a potential member be needed, please let the author know. However, one individual with one type of disability/ functional limit could never be in a position to

advise about the access barriers particular to other types of functional limits. (In addition, individual PWDs should always have a voice in decisions affecting them personally.)

The repository for PWD-relevant guidance and suggestions should be within whichever element of planning or implementation is appropriate (e.g., outreach, drills, inclusive communications), rather than the Equity Council. This is because the goal is for PWD-specific knowledge to be incorporated into the main body of active strategies comprising planning and implementation.

There should be periodic sessions about PWD inclusion as part of the equity and diversity offerings. Apart from the value of information gained, this communicates to the PWD community that planning officials care and are listening to them directly. This would have a valuable impact in itself.

5.3. For municipalities: Overview of other areas in which municipalities should include PWD's needs

The following suggestions for PWD inclusion collected during this research are relevant to municipalities' planning and provision of emergency and other services, in addition to the broader climate resilience planning through MVP. It may be useful for MVP professionals to be aware of these, as they might be offered directly to the municipalities. No short summary or list could be complete; please refer to Appendices 1-3. These are included here in case they might be helpful to municipal planners.

Identification and planning about individual, highest risk residents

The highest-consequence priority regarding PWD inclusion is to prevent avoidable deaths. To do so, municipalities should identify and plan for PWDs for whom climate emergencies create a

significant possibility of death: those who cannot evacuate without assistance, as well as those whose disability or medical condition makes heat emergencies, power outages, or interruptions to medication and treatment potentially lethal. Three communities in Massachusetts have made plans that address some of these. (See Appendix 2).

Some communities have developed voluntary registries, whereby such individuals make their need for assistance known in advance, so that planning can be done proactively, including identifying and coordinating specific emergency response units to be responsible for the highest-risk individuals. However, as a highly experienced PWD disaster specialist said, “if that falls through, you’re dead.” Accordingly, planning must include second and third backups for each critical role. And attention should be paid to increasing the adaptive capacity of PWDs to help themselves when official help doesn’t come through. Suggestions have included access to special ways to call for help that will get through in life-threatening emergencies. This is too crucial to summarize here; please go to the experts.

Programs in Somerville and Boston have done innovative work along these lines in partnership with the local power company and first responders. The goal is to decrease the risk of very serious outcomes or death from power outages in people who require electricity for vital medical equipment (e.g., to assist in breathing or for home kidney dialysis) as well as users of powered wheelchairs. This is also described under “Registries” in Appendix 2.

It should be understood that the community, including first responders, have obligations in this area; this cannot be managed simply through individual preparedness planning. However, it would be make individual planning more effective if financial and logistical support were offered for some of the many effective but costly preparedness suggestions (e.g., extra prescription medication to carry through evacuation or shelter in place, spare batteries for power chairs, or duplicates of key equipment necessary to sustain life).

In the planning process

Planning should envision the needs arising from specific, locally prevalent climate hazards and types of functional disabilities. (E.g., What are the needs of wheelchair users in flooding that requires evacuation?) The Prototype Matrix of Disability and Climate Hazard Interactions (Appendix 4) is a first step towards presenting knowledge in a format that makes the intersections clear.

Accessibility means identifying specific barriers to inclusion in publicly available resources, and finding ways to remove barriers. These will vary depending on people's functional limits or disabilities. These include barriers to access life-saving resources and barriers to accessing emergency communications.

Use principles of Universal Design (UD) – that is, organizational, communication and built environments that are accessible to everyone, rather than having to retrofit. Engage the services of UD experts, and resources are widely available online.

Communications

The Resources section includes links to free, clear information to make sure communications are accessible to anyone, whether the potential barrier is blindness or visual difficulties with aging; being Deaf or having some hearing loss; being both Deaf and blind; or having cognitive difficulties; trouble reading or limited English. This includes small modifications to make accessible every form of broadcast, digital medium, and social medium. This is too much to summarize here.

Digital tools have been remarkable in making communications accessible to PWDs who are blind, Deaf, Deaf-blind; or have impairments in vision and or hearing; with or without non-English translation needs. (Please see Appendix 3, Resources.) However, the commensurate

impact of the “digital divide” is greater in proportion to the impact of those tools. Please keep aware of the major differences in accessing emergency resources and information between those who are “digitally fluent” (and who have digital access, including reliable internet connections) and those who are not.

Implementation

Disaster evacuation, mobility, and sheltering-in-place planning and implementation is a large technical field and will not be addressed here except to note a few examples of special considerations for PWDs.

Personal protective plans should be in place, but also assess whether resources are available to implement them. As PWDs experience higher rates of poverty than the non-disabled, lack of funds may prohibit executing those plans.

Such personal plans almost universally recommend having 3-7 extra days of prescription medicine, but most insurance does not cover this. State government should consider whether a waiver is possible.

Coordination of local resources. All first responders, and others who might be called upon to assist during disasters need to jointly partake in drills and planning exercises. In the Resources section, under Communications, new Federal digital initiatives are described to ensure that different emergency responders can rapidly communicate with each other. One of these is being trialed in Massachusetts.

Post-climate disaster/incident

Extra help should be given to PWDs *after* a disaster to help facilitate recovery.

Equipment necessary for mobility, sight, vision, breathing or communication may need to be repaired or replaced.

As soon as possible after an evacuation, PWDs should be rehoused in the “least restrictive environment”, as required by the Americans with Disabilities Act. For example, it is inappropriate for a person who is blind and who had lived independently in her own home to be housed in a nursing home except for the briefest period of time.

6. CONCLUSION

This project set out to discover how the needs and voices of PWDs were integrated into the planning for the hazards of climate change in Massachusetts; learn about any deficiencies in that work; and determine what solutions were being deployed to address the known problems and by whom. This researcher found that in the primary state assistance program for municipalities, the MVP program, there was a fundamental absence of concrete guidance to cities and towns on PWD-inclusive planning within climate resilience plans. In addition, with the help of experts in the disability emergency assistance field, three specific improvements were identified and should be implemented: specify functional limits across disability types (what an individual can or cannot do, vs. diagnosis); identify the limits most salient in varied climate emergencies; and identify and remove barriers to accessing publicly available emergency resources, such as evacuation alerts.

MVP active interest in recommendations

At the core of this project, the research project identified opportunities to improve the MVP offerings to incorporate the needs and expertise of PWDs in municipal climate resilience planning. The findings were compelling enough, and MVP inclusive and flexible enough, that MVP staff have expressed the intention to consider which recommendations might inform the update to their planning which is in process, and will include a PWD on their Equity Council.

Additional opportunities, contemporary advancements, and notes of hope

Beyond synthesizing solutions to the specific problems sought, this project also revealed additional opportunities and challenges that are ripe for solutions, implementation, and/or future research. Below are a few additional outcomes and parallel advancements in the field that are beyond the scope of this current research, but which complement the core findings of this

project. This researcher hands these off to be furthered or addressed with the wisdom and compassion of the experts encountered and their colleagues.

Integrating the expertise of PWDs and climate resilience planners into a Prototype Matrix Of Disability-Climate Hazard Intersections

This is a single document showing how multiple specific climate hazards affect accessibility needs for a wide range of functional limits and disabilities. It describes the needs of people with a given disability or functional need, in regard to a type of climate hazard. For example, the vertical column “Heat emergencies” intersects with the row “Spinal cord injuries” to indicate that due to thermal dysregulation, people with spinal cord injuries should be prioritized for access to cooling environments in this type of emergency. Both PWDs and climate resilience planners/ environmental specialists can identify how their counterparts in the other field conceptualize these needs.

Current notable advances in the field

It should be noted that more substantive and responsive municipal plans addressing some of the needs and issues with PWDs have been recently released by five of the larger, better resourced, municipalities, that also have long-standing cultures of climate efforts and of diversity inclusion (Appendices 1 & 2). Of special note is the Medford plan, released on April 28, 2022.

Resources beyond the recommendations

All of this project’s resources are offered to climate planners and activists in other locales, including recommendations and resources. Original sources are identified.

Material of potential use to activists/experts trying to create change in their locales

In addition, this paper includes material that will be useful to anyone trying to engender changes in disability and climate resilience at the level of their locale or state, including: findings supporting the need for this change; best practices; examples from municipalities that have already implemented similar programs or key pieces thereof; and a resource list for further information. It also includes the most useful piece of advice: go to the disability experts working in this area. Contact information for key organizations and researchers is provided. The researcher would be happy to help "brainstorm" such efforts.

Develop a consensus classification disability types useful in this and other settings

In developing guidelines to address the needs of PWDs, it became clear that current classification systems to describe individual needs (disability types; functional needs; diagnoses) all have been judged by the field as having some deficiencies. Therefore, a further recommendation is for the disabilities field to develop and agree upon a classification system in a form useful for resilience and emergency preparedness work.

Finally: PWD-inclusive resilience planning can save lives. The impact can be even more direct and identifiable than in other areas of planning. Your decisions can make the difference.

"Disability is the only minority group anyone can join in an instant"

Anonymous, widely quoted

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APPENDICES

Appendix 1

Municipal Climate Resilience and People with Disabilities

Examples of Massachusetts Municipal Climate Plans
The following lists good examples of plans (and plan components) for municipal climate adaptation in Massachusetts. Inclusion criteria are: demonstration of comprehensive planning; having begun implementation; more than passing mention of PWDs along with other vulnerable people; or already having climate emergency programs in place for PWDs and others in need.

Boston
City of Boston - Climate Ready Boston 2016
https://www.boston.gov/sites/default/files/embed/2/20161207_climate_ready_boston_digital2.pdf
https://www.boston.gov/sites/default/files/imce-uploads/2017-01/crb_-_focus_area_va.pdf

Boston Vulnerability Assessment
https://www.boston.gov/sites/default/files/imce-uploads/2017-01/crb_-_focus_area_va.pdf P.23

Cambridge
Cambridge Closer Neighborhoods Technical Report
https://www.cambridgema.gov/-/media/Files/CDD/Climate/resilientcambridge/closerneighborhoodstechnicalreport.pdf
Specifically:
Culture of Climate Action
https://www.somervillema.gov/sites/default/files/somerville-climate-forward-plan.pdf#page=108
Specifically Health and Resilient COmmunity
https://www.somervillema.gov/sites/default/files/somerville-climate-forward-plan.pdf#page=92

Medford
Medford Climate Action and Adaptation Plan - April 2022
Note that PWDs are considered in many aspects of the plan.
http://www.medfordma.org/wp-content/uploads/2022/04/Medford_CAAP_April2022.pdf

Somerville
Somerville's Community Climate Change Plan
https://www.somervillema.gov/departments/programs/somerville-climate-forward

Somerville Climate Forward Plan - Nov. 2018
https://www.somervillema.gov/departments/programs/somerville-climate-forward

Appendix 2

Municipal Climate Resilience and People with Disabilities
Examples of Relevant Municipal Plan Components

Plan Integrating PWDs Into All Aspects Of A Municipality's Planning

Medford, MA Climate Action & Adaptation Plan - April 2022
The most recent municipal plan released is the Medford plan. It integrates, where appropriate, PWD issues throughout their work. This stage of their planning identifies possible action items and suggests types of solutions. Below is a summary of those dozen or so program components where PWDs, along with other vulnerable populations, have been included.
http://www.medfordma.org/wp-content/uploads/2022/04/Medford_CAAP_April2022.pdf

Build capacity for safe, accessible, and inclusive city meetings
Institutionalize policies and systems for making information and city meetings widely accessible for all residents. Adopt protocols such as consistent translation of materials; American Sign Language and spoken language interpretation; expanded meeting times, locations, and formats (in-person and virtual); public transit and ADA accessibility; and childcare for in-person meetings. Regularly seek feedback from community members in order to evolve public engagement.

Increase Medford's energy resilience
Many communities are working to advance climate justice by prioritizing resilient power solutions for buildings. Partnerships that can cluster multiple public and private facilities in a microgrid system, or that share battery storage, are one avenue to reach this goal.

Improve Medford's capacity to stay cool in heat waves by expanding access to public cooling sites
Work with community partners to expand access to cooling sites based on community needs and priorities, prioritizing the needs of people who are disproportionately affected by high heat, including vulnerable populations.

Continue to expand Medford's volunteer response systems
Medford's volunteer response systems, "Are You Ok?" program, provides targeted help during climate hazards, such as extreme heat or storms. Include training for community volunteers on climate hazards, preparedness, and response, and systems for connecting and transporting residents to emergency shelters or cooling centers. For example, volunteers can help residents who don't have air conditioning at home to register for the RIDE in advance of high heat events.

Transportation

> ***Transportation equity***
> Medford's important investments in electric vehicle infrastructure should not be done to the detriment of transportation services for vulnerable populations, who might not be able to buy an electric vehicle, or may rely on public transportation.

Invest in more equitable, accessible, and efficient public transportation systems
In addition to supporting travel via the MBTA, Medford might also help expand options such as the SCM Transportation program that operates paratransit vehicles, providing on-demand, door-to-door services for older adults and residents with disabilities.

Evaluate Medford Public School bus service to achieve equitable access.
Evaluate transportation options to Medford Public Schools with the input of vulnerable groups.

Conduct an equity-centered community process for identifying transit priorities.
Engage community groups representing vulnerable populations and individuals to solicit input on transit needs.

Conduct a participatory mapping mobility study.
Conduct a mobility study to advance Medford's Vision Zero goal that evaluates pedestrian and bicyclist safety, comfort, and accessibility for all intersections and arterials in the city. Do this with the input of vulnerable groups.

Set goals for an "all ages and abilities network."
Drawing from the mobility study, set goals in collaboration with community liaisons for creating an "all ages and abilities network," which would link high-priority areas through protected or separated bikeways and safe pedestrian routes. Seek ways to integrate assistive technology for people with disabilities.

Improve snow clearing to protect sidewalk and bike lane accessibility.
Ensure that the City has the staff and resources for effective oversight, education and awareness-building, and related program support for sidewalk clearing, as well as sufficient equipment and personnel for clearing bike lanes. Evaluate and mitigate any disproportionate burden created by the ordinance on low-income households, residents with disabilities, and seniors.

Adapt transportation infrastructure to new risks from sea level rise, higher-intensity precipitation events, and changing temperatures
Prioritizing investments that support safe and reliable transportation for Medford's communities of color, low income residents, and residents with disabilities will be important to mitigating the disproportionate burden caused by climate change and to supporting equitable access to resources and opportunity for all Medford residents.

Integrate climate risk into transportation asset management

Inventory and expand targeted career training in sustainable industries
Prioritize the recruitment and retention of Medford residents who face systemic and cumulative barriers to economic opportunity, including residents with disabilities.

Evaluate the potential for a community resilience small grants program
Work with service providers and community groups to evaluate opportunities for a small grants program that could provide funding to community organizations and community groups for projects that build community strength, health, and resilience. disproportionately affected by climate change including residents with disabilities.

Voluntary Registries to Assist Individual PWDs in Emergencies

Note: Voluntary registries have been proposed by some PWDs who identify themselves as unable to evacuate in an emergency without assistance.

In addition, Somerville, MA and Boston, MA partner with the local electricity supplier, Eversource, as well as first responders, to create Life Support Registries. These offer people using medical equipment to support breathing or for home dialysis, and users of powered wheelchairs additional resources to keep power outages from becoming life-threatening. As written, they seem valuable, but specific PWD responses weren't found.

However, there are many complex issues in considering such registry plans. See http://www.jik.com/pubs/EmergencyRegistries.pdf for critiques and caveats.

These examples of implemented, proposed, planned, or recommended "registry-related" programmatic segments detail:

- Identifying vulnerable individuals and populations, explicitly including PWDs,
- Locating them geographically, including which neighborhoods they are concentrated in,
- Communicating with those identified in advance of an emergency, (mostly heat waves) Communicating with those identified during an emergency, and
- Assisting them in the emergency, either where they are, or transporting them to safety.

Note that the examples rely on combinations of city staff, volunteers, and utility company staff, to carry out their plans.

Cambridge

In the current Cambridge plan they anticipate a very specific new initiative: "To ensure that individuals with disabilities have the resources needed to withstand a climate-related event, the City could consider the following actions: Assure healthcare service continuity and care during climate-related events focusing on East Cambridge, The Port, Strawberry Hill, North Cambridge. Note the neighborhood-specific prioritization.
(CCPR Resilient Cambridge Handbook strategy A8)."

Somerville Climate Forward Plan - November 2018

https://www.somervillema.gov/departments/programs/somerville-climate-forward

Somerville should "Establish systems to alert public health officials about high-risk individuals or those in distress. Once alerted, officials should conduct direct assessments of high-risk individuals to check for signs of excessive heat exposure or flooding. The City could explore a more in-depth proactive measure to establish a voluntary registry for those with physical, mental, and sensory disabilities to preauthorize emergency response personnel to enter their homes during search-and-rescue operations.1 The Council on Aging has such a system in place that could be expanded."

1 Fairchild, Colgrove, and Jones, "The Challenge Of Mandatory Evacuation: Providing For And Deciding For." As cited by Rudolph, L., Harrison, C., Buckley, L. & North, S. (2018). Climate Change, Health, and Equity: A Guide for Local Health Departments. Oakland, CA and Washington D.C., Public Health Institute and American Public Health Association.

Also noted in the Somerville plan as an additional possibility: "As part of the Resilient Boston plan, the City is leveraging neighborhood-level volunteers to check in on neighbors during heat

events and will partner with nonprofits and healthcare providers to register disabled residents who lack cooling capacity in their homes."

Also in Boston, "Eversource has a life support registry. When the power source is threatened (e.g., for an approaching storm), Eversource makes a proactive call to all life support customers to warn them to make alternate plans. Eversource also monitors their circuits and, if they lose power, calls the Police Department to check on them. During activated heat alert periods.

"Philadelphia and Toronto send field teams to conduct follow-up visits with at-risk individuals identified from hotline calls and, if necessary, transport them to a cooling shelter."

Climate and Health Adaptation in Action - Successes of CDC's Climate-Ready States and Cities Initiative - March 4, 2020
https://www.cdc.gov/climateandhealth/docs/climate-health-successes_508.pdf

"Building Community Resiliency in New York City"
"Disadvantaged communities can face increased risk for climate-related morbidity. They may not have the necessary resources, ability, or information to evacuate ahead of a coastal storm, maintain life-sustaining equipment during a power outage, or stay cool at home during an extreme heat event. Climate interventions promoting connections to neighbors and community institutions can foster social cohesion, which in turn can enhance community climate resiliency and reduce associated adverse health outcomes.

"Be A Buddy (BAB) is a pilot project launched by the New York City Climate and Health Program in July 2017 to increase local climate resilience. It aims to strengthen relationships between residents and local organizations to reduce vulnerabilities to extreme heat and other weather emergencies in four low-income communities in New York City. BAB provides technical expertise, funding, and access to city resources to three participating community organization partners: Brooklyn Community Services, the Point Community Development Corporation in the Bronx, and Union Settlement in East Harlem. Starting in May 2018, the organizations received trainings on heat health, emergency preparedness, and volunteer management.

"In turn, they delivered 50 trainings on heat safety and climate resiliency to their staff, volunteers, and community members. The organizations then implemented risk assessment screenings to identify residents at greater risk for heat-related illness and recruited and trained 64 volunteers to their "Be A Buddy networks" to check on those at-risk residents. In 2018-2019, they activated 17 times for extreme heat and winter/ cold weather events, reaching 454 at-risk residents by phone or in person during the activations. The organizations solidified the social cohesion of the networks between organizations, volunteers, and at-risk residents through 114 engagement events during the first 19 months of the pilot. The knowledge gained through BAB will identify best practices and challenges in increasing connections between local stakeholders to build social cohesion and climate resiliency and to improve health outcomes."

Appendix 3

Resources

Resources for Inclusive Planning

There is a wealth of material already developed by professionals in this field who have disabilities. Resources cover how to assess needs, plan, and implement programs that will minimize the disproportionate loss of life in climate hazards which occur otherwise.

The work of June Isaacson Kailes, Disability Policy Consultant http://www.jik.com/ and The Partnership for Inclusive Disaster Strategies https://disasterstrategies.org are especially recommended; the researcher is indebted to their work. He is a novice in the field of disability, and urges anyone interested to seek out the advice of experts. (However, the author is open to brainstorming about how to identify an entity in your locale which might be receptive to the early stages of this process.)

Ms. Isaacson Kailes provides, for free, many valuable **documents covering specific topics.**

The Partnership for Inclusive Disaster Strategies **works with organizations to provide gap analysis, continuity of operations analysis, tailored trainings, table top and drill exercises, etc.**

Guidance for Integrating People with Disabilities in Emergency Drills, Table Tops and Exercises http://www.jik.com/disability-comp.html

Checklist for Integrating People with Disabilities and Others with Access and Functional Needs into Emergency Planning, Response & Recovery, 2014
"For emergency planners, managers, responders, and public information officers (PIOs) who have responsibility for developing, maintaining, testing, delivering and revising emergency plans and services." http://www.jik.com/plancklst.pdf

Resources for Making digital communications inclusive
Accessible Web Site Design, provided by the University of Washington's Disabilities, Opportunities, Internetworking, and Technology Center.
https://www.washington.edu/doit/world-wide-access-accessible-web-design-1

Creating accessible virtual meetings and digital documents of every kind, including:
-Documents
-Presentations
-Meetings, both virtual and hybrid
-Spreadsheets
-PDFs
-Synchronized media
-Video, audio, social
-Electronic signatures
https://digital.gov/resources/improving-the-accessibility-of-social-media-in-government/
Improving the Accessibility of Social Media in Government covers agencies' responsibilities to ensure that digital services are accessible to all people, individuals with disabilities. Includes recommendations for improving accessibility of social media, tips for making: Facebook posts

accessible, Tweets accessible, YouTube videos accessible; and resources, training, and how to provide feedback (2013).
Section 508 of the Rehabilitation Act requires access to electronic and information technology procured by Federal agencies. *https://www.section508.gov/create*

Web Accessibility Initiative (WAI) provides strategies, guidelines, resources to make the Web accessible to people with disabilities. https://www.w3.org/WAI

Resources for Communicating with Deaf-Blind People
http://www.aadb.org/factsheets/db_communications.html

https://www.pathstoliteracy.org/blog/deafblind-communicator-using-braillenote-touch-plus-connect-others

Modified sign language including tactile fingerspelling. May require a hearing or sighted interpreter. Lacking alternatives, print capital letters on palm. Tech: Screen Braille Communicators; TTY with Braille; Captel.

Planning Resources: *State-focused Programs*

Massachusetts MVP Program
https://resilientma.org/mvp/

California - Beacon Program
Emphasizes both mitigation and adaptation/resilience.
https://www.ca-ilg.org/post/climate-action-plans-local-examples
Reviewing the publicly available documents from 20 cities in the program, all developed within the past ten years, many are robust plans, but even the progress reports from the past few years seem to show that addressing the enormous scope of the adaptation challenge is still in the early stages and half of the plans analyzed mentioned PWD on the lists of vulnerable groups, but in the context of the “they have to be taken into consideration”.

National & International Programs with Resources for Cities and Towns
Georgetown University Law School’s Climate Center - adaptation clearinghouse
https://www.adaptationclearinghouse.org/
State Adaptation Progress Tracker
https://www.georgetownclimate.org/adaptation/plans.html

Climate Adaptation Knowledge Exchange, www.cakex.org
Climate Change, Water, Sanitation and Energy Insecurity: Invisibility of People with Disabilities

Understanding the Impacts of Climate Change and Adverse Weather Events on People with a Disability and their Careers

Climate Equity Series Part 1: Exposed & Closest - Climate Change, Poverty & Homelessness

Equity in Building Resilience in Adaptation Planning

2021 Climate Adaptation Action Plan - U.S. Dept. of the Treasury

2021 Climate Adaptation Action Plan - U.S. Dept. of Transportation

Resilient Cities Network,
https://resilientcitiesnetwork.org/
https://resilientcitiesnetwork.org/?s=disab

Center for Climate and Energy Solutions, www.c2es.org
Our mission is to advance strong policy and ambitious action to: reduce greenhouse gas emissions; promote and accelerate the clean energy transition; strengthen adaptation and resilience to climate impacts; and facilitate the necessary financial investments to do so.

C2ES City & Local Government Policy Hub
https://www.c2es.org/category/policy-hub/city-local/

Cities Advancing Climate Action: Leveraging Federal Funds for Local Impact:
A Resource Guide
https://www.c2es.org/wp-content/uploads/2022/01/cities-advancing-climate-cation-leveraging-federal-funds-for-impact.pdf

UN Office for Disaster Risk Reduction (UNDRR)
Disaster Resilience Scorecard for Cities - Public Health Addendum
https://www.unisdr.org/campaign/resilientcities/assets/toolkit/documents/Disaster%20Resilience%20Scorecard_Public%20Health%20Addendum%20Ver1%20Final_July%202018.pdf

American Public Health Association - Climate Change
https://www.apha.org/Topics-and-Issues/Climate-Change

Climate Change, Health, and Equity: A Guide For Local Health Departments
https://www.apha.org/-/media/Files/PDF/topics/climate/Climate_Health_Equity.ashx

CDC - Climate-Ready States & Cities Initiative
https://www.cdc.gov/climateandhealth/climate_ready.htm

World Institute on Disabilities - Emergencies, Disasters, and Climate Resilience
https://wid.org/climate-change/

Disability Inclusive Emergency Preparedness and Disaster Resilience
https://wid.org/2020/03/17/disaster-preparedness-response-training/

Planning and other Resources
US Census Bureau (n.d.,). Disability Glossary.
https://www.census.gov/topics/health/disability/about/glossary.html

US Census Bureau (2010). Definition of Disability by Severity.
https://www.census.gov/content/dam/Census/library/visualizations/2010/demo/figure-1.pdf

National Center for Health Statistics (2021). Classification of Diseases, Functioning, and Disability. https://www.cdc.gov/nchs/icd/index.htm

Appendix 4

Prototype Matrix of Disability-Climate Hazard Intersections

This matrix is offered as a single graphic-based document showing how multiple specific climate hazards affect accessibility needs for a wide range of functional limits and disabilities. It allows cross-referencing by functional limit and by type of climate hazard. For example, a resilience planner can scan key PWD needs in highest probability local climate hazards; a power wheelchair user can assess and present to local first responders the greatest needs in different climate situations.

Others with greater expertise are invited to modify this, or make a better version. The author has not seen another single document listing multiple specific climate hazards as they intersect with a wide range of functional limits and disabilities. Usually, disability activists describe many ways to distinguish among types of functional limits or disabilities. Climate resilience planners and environmental activists describe many types of weather and climate hazards. What is needed is single documents showing their interaction.

The following is a plain text description of this matrix's general structure, for those using screen readers or with visual difficulties or blindness. The author apologizes for not knowing how to make the entire matrix intelligible via screen reader. This will be updated by the next version of this paper.

The proposed matrix consists of intersecting columns and rows.

Each vertical column, or Y-axis, lists one of the major types of climate or weather hazards experienced or anticipated in Massachusetts.

Each horizontal row, or X-axis, lists a disability, functional limit, or situation that is relevant to the vulnerability of a PWD.

These columns and rows intersect in a box where there is room to describe the needs of people with a given disability or functional need, in regard to a type of climate hazard. For example, the vertical column "Heat emergencies" intersects with the row "Spinal cord injuries" to indicate that due to thermal dysregulation, people with spinal cord injuries should be prioritized for access to cooling environments in this type of emergency.

As noted in the main body of the research paper, there was no widely accepted classification found that describes qualitatively different functional limits and disability types. Accordingly, this matrix is broken into two tables. The first table uses diagnoses to describe disability types and limits. Bearing in mind critiques of the limits of diagnosis in climate emergency planning, the second table uses a blend of functional terms from the US Census categories as well as elements suggested by disability researchers.
End of plain text description of the matrix.

This is a work in progress. Many of the "boxes" will remain empty when the first stage of the project is finished; their purpose is to catalyze those with expertise in resilience planning or in disabilities to articulate their knowledge as it intersects with the others' field of knowledge. This matrix is meant to be only a structure to allow resilience planners and disability activists to communicate their expertise to each other regarding the same goal: improved health and survival of PWDs in climate hazards– on the same page.

Communications

A wealth of resources to make communications accessible to all are listed below the matrix. Please also see that section in "Resources", Appendix 3. However, going forward as digital products are created or updated, it will be far easier to incorporate Universal Design principles from the start– that is, design that assumes differences in abilities and disabilities– than to retro-fit. UD resources are listed under communications.

Applicability to other locales

The climate hazards listed are only the most common in Massachusetts, listed as broad categories. In other regions, local specialists in resilience, disaster or the environment could adapt by adding climate hazards common in their region (e.g., widespread fires, earthquakes, tornadoes, or tsunamis) and dropping those which are of less relevance. The next step would be identifying particular issues for different disabilities and functional limits as they intersect with those different climate hazards. This process can start with resources and references listed in this document, as well as by inviting input from people with the full range of disability types/ functional limits in your locale. This includes sharing lived expertise and full participation in drills, table top exercises, etc.

Prototype Matrix: Disability-Climate Hazard Intersections

DISABILITIES & LIMITS ***Category 1: BY DIAGNOSIS***	**Flood, Fire, Evacuation events**	**Actions in all/ most hazards**	**Shelter in place (when safe for individual PWD)**	**Extreme heat**	
Mobility - moderate	Even if able to walk, may not be able to walk long distances, or walk up and/or down stairs	Be aware that this describes many not IDed as disabled, including many elderly or w/ chronic illness.	Assess beforehand if evacuation without assistance is feasible.	Assess beforehand if resides in "heat island". A/C access? Will power outage, loss of A/C be dangerous?	Assess beforehand if evacuation without assistance is feasible if elevators don't function.

Mobility-severe *Includes all listed under moderate.*	High **risk of death** w/o evacuation planning & reliable implementation lacking all mobility w/o power wheelchair.	Except for shelter-in-place events expected to be brief, evacuation required. Direct assistance needed. Ramps. Accessible vehicle lifts. Functioning elevators.	Assess if solo evacuation feasible.	Spinal injury => acute dysfunctional heat regulation Cannot shelter in place unless cooling is guaranteed; must have backup plan and check-in in case of power outage	Power wheelchairs too heavy to carry w/o ramps, working elevators. Battery recharge after a few days (Kailes, 2009)
Vision impaired - moderate	Navigation support req'd./See "communication" section below matrix	Navigation support req'd./See "communication" section below matrix	Assess if solo evacuation feasible. ADL possible w/o PCAs?		
Vision impaired - severe/ blind	Navigation support required/See "communication" section below matrix	Navigation support required/See "communication" section below matrix			
Hearing - moderate		See communication			
Hearing - severe		See communication			

Category 2: Disabilities & limits by ***SPECIFIC NEEDS***	**Flood, Fire, Evacuation events**	**Actions in all/ most hazards**	**Shelter in place (when safe for individual PWD)**	**Extreme heat**	**Power outage**
Dependent on electricity for breathing assistance, dialysis, other. Footnote see personal preparedness. Include funding for same.[1] [2]	Need battery charged prior to evacuation. Sufficient power to travel. Power wheelchairs may "short out" if unshielded from heavy rain.	**High risk of death** in power outage. Prioritize checks with people w/ life-critical power access needs: backup systems, access to emergency sources. See *Eversource (a Northeast US electrical utility) for extant MA plans.* Appendix 1&2 *See "Voluntary Registries" in Resources, Appendix 3*	Cannot shelter in place without a reliable system of proactive check-ins in case of power outage.	Power outages increase in heat emergencies. May not be able to shelter in place.	Cannot shelter in place during a power outage. (Kailes 2007)
Absolute inability to use stairs. Dependent on functioning elevators (therefore electricity)	Can this person evacuate in case of fire? Prioritize health check to see if shelter in place feasible.	Can this person evacuate in case of fire? Prioritize health check to see if shelter in place feasible. Coordinate w/ local	If power outages likely & elevators mandatory, need reliable way to receive urgent evac assistance– or relocate before need is urgent.		Cannot evacuate w/o assistance in power outage

[1] http://www.jik.com/Power%20Planning%2010.24.09.pdf
[2] https://www.somervillema.gov/sites/default/files/somerville-climate-forward-plan.pdf

Category 2: Disabilities & limits by ***SPECIFIC NEEDS***	**Flood, Fire, Evacuation events**	**Actions in all/ most hazards**	**Shelter in place (when safe for individual PWD)**	**Extreme heat**	**Power outage**
	See Voluntary Registries *in Resources, Appendix 3*	Emergency Services ***See Voluntary Registries,*** *in Resources, Appendix 3*			
Heat intolerance	Make sure evacuation location is cooled. Prioritize for cooling in heat events. Monitor body temp. Health check.		Prioritize for cooling. Monitor body temp, Health check.	Prioritize for cooling. Monitor body temp, Health check.	
Difficulty receiving communi-cations	See "communication", below the matrix	See "communication" below the matrix			
Hearing impaired; lacks digital devices with text to speech capacity	See "communication", below the matrix	See "communication", below the matrix			
Hearing impaired; uses digital devices with text to speech capacity	See "communication", below the matrix	See "communication", below the matrix			
Visually impaired;		Tactile maps of evacuation			

Category 2: Disabilities & limits by ***SPECIFIC NEEDS***	**Flood, Fire, Evacuation events**	**Actions in all/ most hazards**	**Shelter in place (when safe for individual PWD)**	**Extreme heat**	**Power outage**
lacks digital devices with text to speech capacity		routes & w/in shelters. Also see "communi-cation"			
Visually impaired; uses digital devices with text to speech capacity	Will need power to recharge powered communi-cation devices	Navigation assistance req'd. Tactile maps (evacuation routes & w/in shelters) Also see "communi-cation"			Will need power to recharge communicat ion devices
Uses service animals, e.g., guide dogs		Service animals may be at risk in shelters that permit pets.Must accompany person they support. Must be fed & safely housed. Place to relieve themselves.		Animals particularly vulnerable to heat as they can't communicate particular health problems	
Deaf-Blind		See "communi-cation" below			
Cognitively Impaired or intellectually disabled or suffering severe mental illness. Little has been done to identify their		May require direct assistance in decision making & action. Simple language, graphics			

Category 2: Disabilities & limits by ***SPECIFIC NEEDS***	**Flood, Fire, Evacuation events**	**Actions in all/ most hazards**	**Shelter in place (when safe for individual PWD)**	**Extreme heat**	**Power outage**
vulnerabilities in climate emergencies. (Gaskin, 2017)					
Limited English (not a disability)		Simple language. Graphics. Translations into major relevant languages but do not assume literacy in primary language. Interpreters.			
Immune compromised (via medication for autoimmune disorders; cancer treatments; organ transplants; HIV; other)		If relocated, strict infection control needed. PPE. Prioritize HEPA filters, ventilation in shelters, rehousing.		Check for medication needed to be cooled	Check for medication needed to be cooled
Mental illness of all kinds		Anticipate exacerbation of any mental illness in disruptions due to climate hazards. Attempt to provide continuity of any prescription meds		8-12% Increased mental illness emergencies in top 5% of temps. (Nori-Sarma, 2022)	

Category 2: Disabilities & limits by ***SPECIFIC NEEDS***	**Flood, Fire, Evacuation events**	**Actions in all/ most hazards**	**Shelter in place (when safe for individual PWD)**	**Extreme heat**	**Power outage**
Certain medications impair heat regulation (Kreuzer, 2012.)				Antipsychotic meds acutely impair heat regulation. Prioritize cooling center. Rehouse only in a climate-controlled facility.	

Note:

(1) Many people have more than one type of disability or relevant limit
(2) Other societal factors such as poverty or being in a marginalized demographic exacerbate impact, in part due to fewer material resources, thus limiting personal preparation.
(3) Many people who do not identify as disabled will benefit from communications and emergency planning developed from the understanding that many people have functional limits in hearing, seeing, mobility, etc.

Communications:

Modified sign language including tactile fingerspelling. May require a hearing or sighted interpreter. Lacking alternatives, print capital letters on palm.
http://www.aadb.org/factsheets/db_communications.html

Tech: Screen Braille Communicators;
https://www.pathstoliteracy.org/blog/deafblind-communicator-using-braillenote-touch-plus-connect-others

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Endnotes

1. Responses to reducing the impact of climate change include attempts to decrease its causes (mitigation) at the international and national level; actions to decrease the severity of impacts (adaptation) at the national and subnational level; and plans to minimize climate change's negative impacts on people, places, and systems (resilience) at the local level. (Natural Resources Defense Council, n.d.) Many people would refer to the Resilience program described in this project as overlapping with Adaptation. Per NASA's Global Climate Change program, "While climate change is a global issue, it is felt on a local scale. Cities and municipalities are therefore at the frontline of adaptation." (NASA, n.d.)
2. Massachusetts manages the various elements of resilience planning through a close partnership among the Executive Office of Energy and Environmental Affairs (EOEEA), the Executive Office of Public Safety and Security (EOPSS), and the Massachusetts Emergency Management Agency (MEMA).
3. (SHMCAP) "the first [state program] of its kind to comprehensively integrate climate change impacts and adaptation strategies with hazard mitigation planning, also complies with current federal requirements for state hazard mitigation plans and maintains Massachusetts's eligibility for federal disaster recovery and hazard mitigation funding under the Stafford Act."(MassDEP, 2018).
4. Marcie Roth, Director of the World Institute on Disability
5. The following were attended to gain additional perspectives from PWDs about best practices, priorities and principles to guide recommendations for MVP.

United Nations Office for Disaster Risk Reduction:
"Disability inclusive disaster risk reduction – still a tick marking exercise?"
14 February 2022
Discussion of the last decade or so of disability inclusion in disaster risk reduction at an international level: how it's improved and the ways it's still lacking.
https://www.undrr.org/event/disability-inclusive-disaster-risk-reduction-still-tick-marking-exercise

World Institute on Disabilities:
"Leave No One Behind: Updates on Supporting Ukrainians with Disabilities"
31 March 2022
Discussion on aiding in current struggles facing Ukrainians with Disabilities,and increasing evacuation efforts.
https://wid.org/ukrainians-with-disabilities-webinar-and-transcript/

Colorado Homeland Security & Emergency Management:
"Getting it Right: A Plan with Access and Functional Needs Conference"
12 April 2022
Several talks by US-based disability experts on how to plan for emergencies, both from an individual and governmental level.
https://dhsem.colorado.gov/emergency-management/plans/access-and-functional-needs/2022-afn-conference