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An Assessment of Equity, Compounding Disasters, and Climate Change in Hazard Mitigation Planning for the Portland Metro Region

Chris Lower
Portland State University

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by

Chris Lower

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Committee:

Martin Lafrenz, Chair

Jola Ajibade

Alida Cantor

Portland State University

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Abstract

Hazard mitigation plans (HMPs) are strategic documents or policies developed by governments, communities, and organizations to identify risks and reduce the impacts of natural and human-made hazards. These plans aim to minimize loss of life, property damage, and disruption from floods, wildfires, snowstorms, heatwaves, and other disasters. While useful, these plans infrequently and unevenly address the lived experiences of marginalized populations who bear the disproportionate impacts of recurrent disasters. Technocratic planning goals exacerbate these impacts by failing to center inclusive and equity-focused approaches, thus eroding the resilience capacities of many vulnerable groups including the poor and communities of color. In this paper, I use content analysis to understand how HMPs in the Portland Metro region address multi-hazard scenarios, climate change, equity, and social vulnerability. For comparison, I perform a similar analysis on local climate action plans and policies authored by community advocacy groups. A political economy framework is employed to interrogate if and how these different plans are working to disrupt or reinforce structural inequalities within a disaster management context. Findings revealed cascading disasters, social vulnerability, climate change and equity were inadequately addressed by HMPs. Only CAPs robustly acknowledged the role of climate change in present and near future disaster trends, discussed the interdependencies between extreme weather hazards, and offered strategies for achieving equitable disaster management outcomes. This study highlights the need for greater communication between disaster management experts, climate scientists, and community residents to produce equitable DDR strategies that not only dismantle the structural inequalities responsible for social vulnerability but also account for the overlapping and compounding nature of extreme weather events.

1 Introduction

Extreme weather events often have complex interdependencies and shared climatic drivers that lead to overlapping or consecutively occurring disasters unprecedented in scale and impact (Zscheischler et al., 2018). Often referred to as ‘compounding’ or ‘cascading’ disasters (Cutter, 2018), the magnitude of these events present considerable challenges to disaster management professionals as they often cause mass casualties, the displacement of entire communities, and widespread socio-economic disruption (Thomas, 2017). Consider Oregon’s 2020 wildfire season

where twenty-one fires burned over one million acres, claimed nine lives, destroyed nearly 5000 homes and businesses, and forced the evacuation of over 40,000 people (Russell et al., 2024). Additionally, the thick haze of smoke produced by the wildfires resulted in record-setting levels of air pollution and a 24.9% statewide increase in healthcare admissions due to smoke-related respiratory distress (Trenga, 2023). This cycle of wildfire followed by hazardous air pollution illustrates how disasters are rarely standalone events (Gill and Malamud, 2016); rather, they often occur in succession, follow a particular sequence of events, and increase a community's vulnerability to future hazards (de Ruiter et al, 2020).

Despite the interconnected and co-contributive nature of extreme weather events, hazard mitigation plans (HMPs) have historically failed to account for consecutively occurring disasters and their impacts (Chen and Greenberg, 2021). Instead, they predominantly adopt a 'single hazard approach' that treats natural disasters as isolated events occurring independently and in isolation from one another (Gill and Malamud, 2016). Zscheischler et al. (2018) argue this long standing trend of planning for and assessing disasters as singular, independent phenomena is problematic since extreme weather hazards frequently overlap spatially and temporally and often do so as recovery from one hazard is still underway (de Ruiter et al., 2020). The Portland Metro region experienced this firsthand in 2021 when a deadly heat wave claiming the lives of 72 people (Multnomah County, 2022) coincided with the onset of the state's 2021 wildfire season. Consequently, Oregon's disaster management officials found themselves scrambling to safeguard communities from two simultaneously occurring hazards while healthcare providers, still burdened with an increase in admissions due to record-breaking heat (Nori-Sarma et al., 2022), now had to respond to an influx of patients struggling with smoke-induced respiratory problems. This example of overlapping hazards underscores how HMPs can leave communities underprepared for the deadly consequences of extreme weather if they fail to consider multi-hazard scenarios.

Another shortcoming of HMPs is their tendency to deploy strategies out of touch with forecasted climate trends (Stults, 2017; Hu et al., 2018). Thomas (2017) argues this disconnection correlates to a modern society that has only recently experienced significant impacts due to climate change and is still coming to terms with a rise in the frequency of extreme weather events. For instance, the World Meteorological Organization (WMO) and United Nations Office

for Disaster Risk Reduction (UNDRR) found that climate- and weather-related disasters have increased fivefold over the past fifty years (Douris and Kim, 2021), thus suggesting previous generations were not tasked with preparing for the frequency, scale and scope of climate hazards occurring today. Unfortunately, present day planning regimes have struggled to adapt to the rapidly changing spatiotemporal patterns of extreme weather as is evident in how long it takes government agencies to react to such changes. Case in point, the Federal Emergency Management Agency (FEMA) still does not recognize heat as a disaster eligible for grant monies or post-disaster assistance (Lawton, 2024), even though extreme heat kills more Americans than any other weather-related event (Adams-Fuller, 2023). Poor integration between rapidly changing climate dynamics and disaster management policy is not merely an issue at the federal level. In their examination of 153 municipal emergency management planning documents collected from four midwestern states, Hu et al. (2018) found none referred to climate change extremes in their goals and objectives. These slippages in linking forecasted climate trends to disaster preparation and response indicates many local HMPs are at risk for not proactively aligning emergency management policies with the hazards of tomorrow.

Regardless of a hazard's frequency, severity, and type, scholars have long recognized low income and historically marginalized groups are disproportionately impacted by natural disasters and face multiple barriers to recovery (Alvarez and Cardenas, 2019; Fox et al., 2023). This is further magnified by resource allocation schemes and hazard planning goals that compound existing social, racial, and economic inequities by privileging more affluent, mostly white communities (Collins and Jimenez, 2016). In an attempt to make emergency management programs more equitable, the concept of equity has become an oft cited and frequently aspired disaster planning principle increasingly found throughout multiple scales of public administration (Johnson and Svara, 2014; Loh and Kim, 2020). This can be seen at the federal level in FEMA's recent commitment to include equity as a foundational element of its strategic goals (Webster and Lee, 2022). Additionally, FEMA has asked state governments to "plan for equitable outcomes" and stipulates, "By leading with equity, states can form mitigation strategies that reflect the whole community" (FEMA, 2023, 2). County and city serving governments are also incorporating equity into their disaster management policies as highlighted in the Portland Bureau of Emergency Management's 2017-2021 Strategic Plan, which seeks to achieve ". . .

citywide equity goals by implementing programs and services that reduce the impacts of disasters" (5).

What remains unclear, though, is how these government pledges to prioritize equity are being operationalized into tangible hazard mitigation strategies. In a review of 48 municipal, county, and multi-jurisdictional HMPs drafted in Michigan, Loh and Kim (2020) found almost none mentioned equity and even fewer offered well defined equity goals. Berke et al. (2019) discovered that HMPs written for several major East Coast cities either did not address equity or they recommended equity-based actions that failed to achieve risk reduction for vulnerable populations. Further, despite calls to more fully include equity as a metric for evaluating the quality of planning documents (Berke and Godschalk, 2009), there is still a dearth of research that comprehensively assesses how equity is defined, measured, and actualized in county and city planning efforts (Loh and Kim, 2020). Following these findings, it seems defining and prescribing effective equity-based policies remains a low priority for many hazard mitigation experts despite government agencies' recent commitment to the idea of equitable outcomes.

To best minimize and prepare for the impacts of disasters, HMPs need to be evaluated based on how they address existing inequities in their target communities and how they interface their objectives with multi-hazard scenarios and forecasted climate trends. Yet little analysis has been done to determine how robustly and comprehensively HMPs are engaging with these topics, either singularly or collectively. In this paper, I seek to address this knowledge gap by performing a systematic review of government authored HMPs in the Portland Metro region. I use qualitative coding methods to understand how these plans a) align their priorities to current and forecasted climate trends, b) incorporate compounding disaster scenarios into their preparation and response activities, and c) operationalize equity to minimize disparities in risk exposure and impacts. I next compare my findings to disaster management objectives outlined in climate action and community-designed plans to identify noteworthy trends, similarities and discontinuities. I follow with a brief discussion on how political economy can be an effective lens through which to interrogate disaster planning efforts in the Portland Metro region. Finally, I offer concluding thoughts for how the next generation of HMPs can more effectively account for fluctuating climate patterns and overlapping and consecutive disasters. The idea of 'transformational disaster management' will also be explored as a theoretical and practical

framework for achieving hazard mitigation goals that simultaneously reduce the impacts of weather-related disasters while also redressing the historical inequities that continue to pervade present day emergency management protocols.

2 Methods

To understand how risks and impacts associated with climate-driven hazards are being considered in the Portland Metro region, I conducted an analysis of twenty-three locally authored planning policies. Eligible texts included a mix of documents drafted by government agencies and community advocacy groups located throughout Multnomah, Yamhill, Clackamas, Washington, and Columbia [1] counties. Government authored policies were categorized as being either an HMP or a Climate Action Plan (CAP). A designation of 'Community Plan' (CP) was used for policies written by community advocacy groups with these documents often having multiple priorities including social justice, environmental stewardship, grassroots activism, and workers' rights.

Whenever possible, the two most recent plans in terms of matching scale, geographic area, and type were included for assessment – e.g., the 2014 and 2020 versions of the Yamhill County Multi-Jurisdictional Hazard Mitigation Plan reflect the same scale (multi-jurisdictional), geographic area (Yamhill County) and type (HMP). This resulted in a review of plans authored between 2011 and 2021, the goal being to tease out potential shifts in how newer versus older policies articulated disaster management goals, logistics planning and strategy, and conceptual frameworks; it also allowed for an analysis of how older and newer plans prioritized specific types of hazard events and how these differences intersected with the material and social impacts of a rapidly changing climate. Additionally, it provided a means of temporal comparison to understand how considerations of social vulnerability, equity, and resilience were addressed and in what ways. Finally, all texts were scrutinized to identify if they framed hazards as isolated, singular phenomena, or if they were conceptualized as interrelated, overlapping, and/or consecutively occurring and how the ways in which disasters were defined led to differences in DDR activities. Only those hazards related to extreme weather events were included in the study (e.g., heat, winter storms, wildfire, flooding, etc.) with human-made and geological disasters excluded (e.g., earthquakes, volcanic eruptions, dam breaches, chemical spills, etc.)

To facilitate analysis of the plans, Sysrev software was used to create a database of 102 questions that were either closed (e.g., 'true or false') or open-ended (e.g., 'how is equity defined'). Answers to these questions were coded by myself and a second graduate student to identify recurrent themes and patterns that could be organized into discrete categories. Similarities and differences in terminology, definitions, operational goals, and long- and short-term strategies were scrutinized to see how each plan dealt with several key issues including: how is equity defined and operationalized in DDR activities? Are policymakers acknowledging and seeking to address the socioeconomic and racial inequalities that create social vulnerability and lessen disaster resilience among traditionally underserved communities? How are disasters in the Portland Metro region prioritized and are these understood within the context of regional and global climate change? Are planners identifying linkages between certain hazards in terms of shared drivers, consistencies in time intervals, and recurring spatial patterns? Are adjustments and upgrades to pre-existing cycles of disaster risk management being made to reflect the compounding nature of hazards and their impacts?

To test for consistency in how policy content was interpreted, I met multiple times with my colleague to resolve any conflicting codes and to agree upon which one should be used for final assessment. These results were then compared and contrasted among each of the three plan typologies to provide a meta-analysis of core similarities and differences. Lastly, a political economy lens was employed to evaluate how unequal power dynamics are manifest among various stakeholders and community members and if proposed DDR strategies are working to disrupt or reinforce these inequalities.

3 Results

a. Government Hazard Mitigation Plans

Thirteen HMPs authored between 2014 and 2021 were analyzed for this study (Table 1). The geographic focus for these plans included one or more of the following jurisdictional categories: municipal, county, unincorporated, and fire district. The lone exception was the *2021 City of Portland Floodplain Resilience Plan Discussion Draft*, which examined flood risk and impacts within the spatial context of a local floodplain. In all cases, the HMPs designed strategies and goals meant to be operationalized within their stated boundaries, although several plans acknowledged the potential for cross-collaboration between jurisdictional bodies of varying

scales located in adjacent or distant geographic regions (e.g., nearby cities and counties, state offices, etc.). When addressed, the topic of cross-collaboration was framed as a means of recognizing hazards and their impacts do not always fall neatly within socially constructed jurisdictional boundaries; moreover, scarcities of capital resources, personnel, equipment, and expertise often necessitate outreach to other communities situated beyond the impacted region.

Plan Title	Geographic Focus	Jurisdictional Bodies	Scope of Plan
2014 *Yamhill County Multi-Jurisdictional Hazard Mitigation Plan Update*	County and municipalities	Yamhill County, cities of Amity, Dayton, Dundee, Lafayette, Newberg, Sheridan, Willamina and Yamhill	Hazard Mitigation
2014 *Columbia County Multi-Jurisdictional Hazard Mitigation Plan*	County and municipalities	Columbia County, cities of Clatskanie, Columbia City, Prescott, Rainier, St. Helens, Scappoose and Vernonia	Hazard Mitigation
2016 *City of Tigard Natural Hazards Mitigation Plan*	Municipality	City of Tigard	Hazard Mitigation
2017 *Washington County Emergency Operations Plan*	County	Washington County	Inter-agency emergency planning and coordination
2017 *Washington County Natural Hazard Mitigation Plan*	County and municipalities	Washington County, cities of Tigard and Hillsboro	Hazard Mitigation
2017 *Clackamas County Emergency Operations Plan*	County	Clackamas County	Inter-agency emergency planning and coordination
2017 *Multnomah County Multi-Jurisdictional Natural Hazards Mitigation Plan*	County and municipalities	Multnomah County, cities of Fairview, Troutdale, Gresham, and Wood Village	Hazard Mitigation
2018 *City of Portland Resilience Infrastructure Planning Exercise*	Municipality	Portland	Urban resilience, hazard mitigation
2019 *Governance for Urban Resilience*	Municipality	Portland	Resilience

2019 *Clackamas County Multi-Jurisdictional Hazard Mitigation Plan*	County and municipalities	Clackamas County, cities of Canby, Lake Oswego, Johnson City, Happy Valley, Wilsonville, Molalla, West Linn, Sandy, Gladstone, Estacada, Oregon City and Clackamas Fire District #1	Hazard Mitigation
2020 *Yamhill County Multi-Jurisdictional Hazard Mitigation Plan Update*	County and municipalities	Yamhill County, cities of Amity, Dayton, Dundee, Lafayette, Newberg, Sheridan, Willamina and Yamhill	Hazard Mitigation
2020 *Beaverton Natural Hazards Mitigation Plan*	Municipality	Beaverton	Hazard Mitigation
2021 *City of Portland Floodplain Resilience Plan Discussion Draft*	Floodplain	Watersheds of Columbia River, Columbia Slough, Willamette River, Johnson Creek, Fanno Creek and Tyron Creek	Urban resilience, ecosystem restoration, sustainability, hazard mitigation

Table 1. HMPs by type in chronological order of publication.

Hazard mitigation was the dominant focus and operational platform for these plans, demonstrating a singular framework for disaster management. City-based HMPs were the result of planning efforts coordinated by actors working for or on behalf of the stated municipality, whereas multi-jurisdictional HMPs (MJHMPs) were initiated by county offices who co-authored them with some of the most populous cities nested therein; an example is the *Yamhill County Multi-Jurisdictional Hazard Mitigation Plan,* which reflects a regional effort co-produced by Yamhill County and eight of its largest cities. County fire districts responsible for providing fire prevention and emergency services for unincorporated areas and small townships were also listed as important co-contributors; an example is the 2019 *Clackamas County Multi-Jurisdictional*

Hazard Mitigation Plan co-authored by Clackamas County, twelve of its largest cities, and Clackamas Fire District #1.

All of the plans leveraged a wide range of expertise as indicated by the diversity of stakeholders, departments, and officials acknowledged as participating actors. This included but was not limited to representation from non-profits, small and mid-sized businesses, federal military bases, local universities, and staff from a wide range of municipal and county agencies (e.g., public works, planning, transportation, parks and recreation, emergency medical services, etc.). Participation from local tribes was rare, and only three plans noted the inclusion of Indigenous groups – the 2017 *Clackamas County Emergency Operations Plan,* the 2017 *Washington County Emergency Operations Plan*, and the 2021 *City of Portland Floodplain Resilience Plan Discussion Draft*. The inclusion of community residents and/or members of community-based organizations was evident in most of the documents with these individuals serving on steering committees and/or fulfilling an advisory role during the plan's initial draft phase.

All of the plans considered a broad range of climate- and weather-related hazards with flooding, landslides, windstorms, drought, wildfire, and winter storms being the most frequently addressed). A policy's decision to include a particular hazard depended on its historical relevance to the region with significant past events cited as justification for why some disaster types were included and others were not. This observation is underscored by the fact only four (30.8%) of the plans dealt with extreme heat, and only two (15.4%) significantly addressed wildfire generated smoke, despite these hazards being among the most frequent and concerning disasters in recent years (Department of Environmental Quality, 2023; Kohon et al., 2023; Philip et al., 2022; FEMA, 2024). Conversely, all of the plans dedicated an extensive amount of attention to flooding even though the latter has lessened significantly over the past ten years (FEMA, 2021; FEMA, 2024). Wildfire generated smoke was mentioned by eight plans (61.5%); however, impacts and planning strategies related to smoke were not explored in-depth, and air quality issues related to wildfire were not given the same degree of thoughtful analysis as other hazards. One exception was the 2017 *Multnomah County Multi-Jurisdictional Natural Hazard Plan*, which provided a detailed assessment of the public health risks posed by wildfire smoke, "Breathing in wildfire smoke can cause coughing, stinging eyes, trouble breathing normally,

scratchy throat, runny nose, irritated sinuses, wheezing and shortness of breath, chest pain, headaches, tiredness, an asthma attack, and fast heartbeat" (3.6.4, 13).

Very little content was found in the HMPs regarding positive impacts associated with hazards. One notable difference was the 2014 *Columbia County Multi-Jurisdictional Hazard Mitigation Plan*, which explained how wildfires are part of the natural ecology of wildlands and create open spaces for plant and animal habitat; additionally, fires ". . . also reduce fuel loads in areas, which in turn decreases the potential for large catastrophic fires" (5-18). The 2014 *Yamhill County Natural Hazard Mitigation Plan* was unique in that it touched upon the cultural significance of wildfire, showcasing how Indigenous groups historically started wildfires as a means of improving sanitation, terrain visibility, agricultural yield, and overall safety. Finally, the 2021 *City of Portland's Floodplain Resilience Plan Discussion Draft* acknowledged flooding as an integral part of the hydrological cycle that recharges aquifers, regulates water volumes, and cycles nutrients and sediment throughout aquatic habitats.

The HMPs failed to frame natural hazards within the context of a warming climate and generally made minimal connections between changing climatic drivers and the frequency, intensity, and recurrence of regional disasters. All of the policies described potential combinations of disasters (e.g., flooding + landslides, heavy snow + meltwater flooding, wildfire + smoke, etc.), yet none created comprehensive action plans based on multiple hazards occurring simultaneously, overlapping, or cascading in sequential fashion. Instead, all of the HMPs isolated disasters into singular topics and developed DDR strategies accordingly, meaning mitigation, preparation, response, and recovery activities were presented on a hazard-by-hazard basis. For example, the 2017 *Washington County Emergency Operations Plan* acknowledged the interrelated nature of disaster events and impacts but explicitly stated it would only address hazards as singular events, "The methodology used in this hazard analysis recognizes that many hazards occur together or as a consequence of others but seeks only to address each hazard as a singular event" (3-4). While the term 'multi-hazard' was often used in several of the policies, its use should not be confused as a meaningful engagement with the concept of compounding and overlapping disasters and their connected and magnified impacts. Instead, 'multi-hazard' referred to the multi-purpose nature of several DDR strategies that were not disaster-specific and could apply to multiple hazard types: "There are mitigation measures and potential action items that can be applicable to

more than one hazard. Addressing these multi-hazards items together rather than by specific hazard offers a more practical, coordinated, and cost-effective approach than trying to address them within each hazard" (2020 *City of Beaverton Natural Hazards Mitigation Plan*, 2-33)

Only the 2014 *Yamhill County Multi-Jurisdictional Hazard Mitigation Plan Update,* provided a thoughtful explanation of compounding disasters and how they manifest: "Primary natural hazard events frequently trigger secondary hazards, increasing potential loss to life and property. It is important to consider the compounding effects that may occur when multiple natural hazards impact an area. In these cases, the effects of hazards can be magnified to create a disaster that would not be present if only one hazard incident had occurred . . . compounding disasters occur when one or more hazards impact a region, either simultaneously or sequentially. In these cases, multiple hazards exacerbate the impacts to a region, often resulting in a disaster where one would not have otherwise resulted . . ." (4-5). The 2020 *City of Beaverton Natural Hazards Mitigation Plan* mentioned the possibility of compounding disasters, but only as unlikely events: "While remote, the potential exists that the city could experience the impacts of two different natural hazards at the same time." The remaining HMPs addressed the topic of compounding disasters minimally by connecting certain hazard types with words and phrases such as 'amplified,' 'triggered by,' and 'combined secondary events.'

The majority of response types to both singular and compounding disasters were grouped into one or more of the following categories: preparation, mitigation, recovery and response. Climate adaptation, resilience, and sustainability were rarely acknowledged as a response action separate from DDR categories. The majority of suggested DDR actions were weighted toward mitigation and preparedness with recovery being targeted the least. One exception was the 2018 *Resilient Infrastructure Planning Exercise Summary of Findings (RIPE),* which used scenario building exercises to identify short-term, intermediate, and long-term recovery steps that can repair and rebuild resilient urban systems: "RIPE was specifically focused on the intermediate and long-term recovery phase of a disaster rather than emergency response . . . Steps taken by Portland to build resilience (e.g., mitigation and preparation), and to have clearly established recovery priorities in place prior to a disaster, will have positive cascading effects resulting in a faster and more successful recovery" (1).

Many response types were driven toward protecting, fortifying, and rebuilding infrastructure and property with mortality also being acknowledged as an area of strong concern. Generally, the HMPs utilized a macro-level perspective when assessing hazard impacts and responses, framing these in broad brushstrokes that encompassed entire sectors and population bases rather than specific communities. As a result, the HMPs often lacked a more granular perspective that accounted for impacts on individual livelihood and the sub-components of larger systems. For example, in terms of the healthcare sector, there were few examples of a substantial analysis of urgent and emergency care facilities vis-à-vis inpatient hospital capacities. Oftentimes, analysis of the latter was relegated to generalized comments and/or spatial identification of available healthcare facilities. DDR actions targeting environmental degradation were sparsely addressed by the HMPs. When it was acknowledged, it was done so strictly within the context of human utility – i.e., how the protection and remediation of green and blue spaces can serve human needs and well-being. One exception was the 2021 *City of Portland's Floodplain Resilience Plan Discussion Draft*, which extensively dealt with the restoration of riverine habitats as a means of reinvigorating salmon and other aquatic species regardless of how these activities may or may not benefit human beings.

Equity and social vulnerability were unevenly addressed by the HMPs. Some plans created umbrella terms to subsume multiple groups into a single, generalized category; an example of this was noted in the 2017 *Clackamas County Emergency Operations Plan*, which categorized youth, elderly, disabled, houseless, ethnic minorities, pregnant women, non-English speakers, and individuals without vehicles or having medical conditions as "special needs populations." HMPs using umbrella terms often failed to design DDR strategies based on the unique needs presented by specific marginalized and vulnerable groups, claiming the response targeting for these individuals are already factored into the policy's broader DDR strategies: "As appropriate, all functions address the needs of special populations including, but not limited to persons with access and functional needs and non-English speakers" (*2017 Washington County Emergency Operations Plan*, 2-8). The *2016 City of Tigard Natural Hazards Mitigation Plan* did not identify <u>any</u> groups as being vulnerable, therefore, no response activities were designed to assist Tigard's vulnerable populations.

Vulnerable groups most frequently acknowledged as needing customized response actions included youth, the elderly, communities of color, non-English speakers, and the poor. Other groups noted, but not nearly as frequently, included tourists, veterans, pregnant women, migrants, and the houseless. Indigenous people were not mentioned in any of the plans, although this may be due to the authors placing these populations into a broader category such as 'ethnic minorities.' DDR activities targeting vulnerable individuals were largely of the mitigation and preparedness type with several being communication and/or education-based (e.g., providing hazard preparedness literature in Spanish). Unsurprisingly, the HMPs made few linkages between the root causes of social vulnerability and how these necessitate the need for specialized DDR response activities. Consequently, plans that identified linkages between DDR and vulnerability were limited in their analysis and presented technical fixes as solutions including increases in infrastructure and critical facilities; thus, HMPs that acknowledged connections between DDR and vulnerability did so in technocratic and engineering terms and failed to acknowledge the historical, political, and social dynamics responsible for vulnerability. Resilience was often cited as a goal for many of the policies, but this was typically done nominally with few specific ties to actionable steps; additionally, a clear definition of resilience was lacking in most plans even in those that mentioned resilience in their title or mission statement.

As in the case of social vulnerability and resilience, equity was inadequately considered in many of the HMPs, which either lacked a clear definition of the term or failed to explicitly state its role in mitigation planning. This is not to say that equity was completely overlooked as a desirable goal, since some of the HMPs made an earnest effort to include the concept in their mission and/or vision statements. However, calling out the need for greater equity is not the same as putting tangible policies in place, and only a few of the HMPs attempted to expand on how they plan to address long standing inequities within the sphere of disaster management. Even plans that presented equity-focused response strategies did not do so uniformly, meaning an HMP might suggest equity-based strategies for one or two hazards, but neglected to do so for other hazards. Moreover, little prioritization was given to the concept of 'spatial equity'; thus, there were few examples where HMPs targeted specific neighborhoods known to contain disadvantaged and highly vulnerable populations. Of the examples that did exist, most were confined to addendum sections that provided maps of critical and essential facilities (e.g.,

assisted living and correctional facilities, mobile home parks, etc.), the assumption being that these sites were part of a vulnerability-prioritized evacuation plan. Some of the more comprehensive plans, particularly the MJHMPs, called out specific areas as having disproportionate numbers of disadvantaged and underserved populations, but these were broad acknowledgements that failed to connect actionable disaster policy with actual people.

Since equity was unevenly addressed in most of the HMPs, it is not surprising the policies generally ignored issues of scope, speed of implementation, proposed timelines, or metrics for measuring equity-focused strategies. Moreover, details related to the funding of such activities were non-existent. Most of the plans had some measure of public participation with many having community members on their steering committees. There were also several instances where government offices hosted public forums to obtain suggestions from affected communities; municipal and county websites also gathered information via online surveys and questionnaires as to what response activities mattered the most to residents.

b. Climate Action Plans

Analysis was performed on five government-authored climate action plans (CAPs) published between 2015 and 2020 (Table 2). Unlike the HMPs which were drafted by municipal and county offices located in five different counties, the CAPs were mostly authored by government offices in Multnomah County and the city of Portland. Exceptions to this were the 2020 *Beaverton Climate Action Plan* and 2020 *Lake Oswego Climate Action Plan* [2], which represent cities from Washington and Clackamas counties, respectively. Notably, CAPs were not available for Yamhill and Columbia counties. Similar to the HMPs, implementing actors for the CAPs were diverse and represented multiple segments of the private and public sectors. Unlike the HMPs, however, there was robust participation by community residents and advocacy groups including the Coalition of Communities of Color, Youth of Lake Oswego, and the Indigenous-led Wisdom Council of Elders. Having an increased level of participation from these groups may be one reason why justice and equity were major elements found throughout all of the CAPs, a trend that will be expanded upon later in this section. Other noteworthy contributors included faculty and graduate students from nearby urban-serving universities.

Plan Title	Geographic Focus	Jurisdictional Bodies

2015 *Portland* and *Multnomah County Climate Action Plan*	County	Multnomah County
2016 *City of Portland Climate Action Through Equity*	Municipality	Portland
2017 *Portland-Multnomah County Climate Action Plan Progress Report*	County and municipality	Multnomah County and city of Portland
2019 *Beaverton Climate Action Plan*	Municipality	Beaverton
2020 *Lake Oswego Climate Action Plan*	Municipality	Lake Oswego

Table 2. CAPs by type in chronological order of publication.

As expected, these plans had a strong focus on greenhouse gas (GHG) emissions, their sources, and potential steps to limit their production. Additionally, emphasis was placed on the consequences climate change is having on environmental systems, urban infrastructure, and human health and well-being. The word 'resilience' was mentioned numerous times in the CAPs but only in broad terms that framed the concept as an ancillary benefit of emissions reductions (e. g., "communities becoming more resilient to climate change"). While disaster management and planning were not focal points, the CAPs fully explored a wide range of potential hazards and anticipated impacts within the context of climate change. Among these, flooding, wildfire, diminished air quality, extreme heat, winter storms, and drought were the most widely discussed. Unlike the HMPs, these policies linked disaster events directly to climate variability and change. Another notable difference was in the choice of hazards the CAPs prioritized. For instance, whereas the majority of HMPs neglected to address extreme heat and wildfire-generated smoke, all of the CAPs dedicated much discussion to both of these hazards. For example, the 2015 *Portland and Multnomah County Climate Action Plan,* 2019 *Beaverton Climate Action Plan* and 2020 *Sustainability and Climate Action Plan for Lake Oswego* all emphasize the dangers posed to communities from extreme heat and wildfire produced smoke and address these threats through a number of public health and safety efforts. Interestingly, the focus on diminished air quality and extreme heat predated the unprecedented Labor Day wildfires of 2020 and the record-setting heatwave of 2021.

The CAPs all demonstrated engagement with the concept of cascading disasters, although there was no universal, refined definition of the term. Instead, these plans nested compounding and consecutive disasters within the context of a changing climate, meaning the latter was described

as the springboard from which extreme weather hazards arise; consequently, climate change and variability were emphasized as triggering forces for certain natural disasters, which should be understood as connected phenomena with complex interactions and a range of inter-related outcomes. As an illustration of this, the 2020 *Sustainability and Climate Action Plan for Lake Oswego* explains how climate variability can lead to a lack of summer snowmelt which in turn contributes to an increased risk of drought and wildfire, both of which negatively impact human health, economies, infrastructure, property, and general well-being.

All of the CAPs incorporated several strategies related to preparedness and mitigation with many addressing how environmental spaces might be better managed – e.g., updating flood zone maps to incorporate climate change projections and weather variability; plan for summer drought by creating water conservation strategies and use drought-resistant native plants for environmental restoration projects; use nature-based mitigation strategies to increase floodwater storage; and invest in indoor recreation facilities to maintain the health and well-being of residents during periods of extreme heat, cold, and poor air quality. It should be pointed out that unlike the HMPs, the CAPs favored preparedness and mitigation strategies and invested less effort in designing recovery and response activities; this tendency aligned with the CAPs overall focus to 'plan ahead' by mitigating GHG emissions and the forecasted consequences of climate change (e.g., more intense winter storms, hotter summers, etc.).

In general, the CAPs centered people in many of their policy recommendations with special consideration extended to vulnerable and traditionally underrepresented groups including communities of color, the elderly, immigrants, frontline workers, and the poor. This resulted in expanded discussions concerning social, environmental, and climate justice and how these can be achieved through the mitigation of GHG emissions, since climate change is widely acknowledged as disproportionately impacting the poor and communities of color (Intergovernmental Panel on Climate Change, 2018; Islam and Winkel, 2017). This focus on the connections between climate change and vulnerable populations was evident in multiple preparedness and mitigation strategies: "Work with those populations typically overlooked in [energy efficiency] incentive programs – renters, low-income homeowners, non-English speakers and the elderly" (2020 *Sustainability and Climate Action Plan for Lake Oswego*, 17). Additionally, and quite different from the HMPs, these policies avoided cursory and/or broad

umbrella terms for who should be considered vulnerable; instead, vulnerable groups were clearly identified with action steps formulated for the specific needs of these populations. The CAPs also made connections between underlying social vulnerability and how this is a driver for increased risk. For instance, the 2015 *Portland and Multnomah County Climate Action Plan* explained how poverty reduces the likelihood of vehicle ownership, which means many low-income residents are disproportionately reliant on public transit; unfortunately, walking to and from and waiting at transit stops can increase exposure to extreme heat (109). There were also examples of connecting DDR activities to vulnerable groups such as partnering government agencies with Adult Community Centers to provide outreach to senior citizens regarding the risks associated with wildfire smoke and heat, since these hazards are known to pose significant risks to the elderly. Overall, the CAPs took the position that all aspects of planning need to account for climate change; and by extension, climate related planning endeavors need to equally account for vulnerable populations and seek to remedy the underlying drivers of vulnerability. Frequently cited methods for achieving this goal included justice-oriented planning, cultural respect and inclusion, working toward redressing systemic inequalities, and expanded access to transportation, renewable energy, and green amenities.

Equity was a primary consideration for the CAPs with Multnomah County and the city of Portland supplementing their main policy with the 2016 brief, *Climate Action Through Equity.* This report expressly defines the consequences of inequity, offers examples of disparities, and discusses key drivers of marginalization: ". . . communities of color and low-income populations in Portland have been under-served by programs and investments and under-represented in decision making on climate policy. Lack of low-carbon, safe transportation options, insufficient housing and inability to afford healthy food are examples of disparities experienced by these communities that result in fewer benefits from climate action opportunities . . . These inequities primarily result from ongoing institutional racial bias and historical discriminatory practices that have resulted in the inequitable distribution of resources and access to opportunities" (3). The other CAPs also provided clear statements and definitions of equity when compared to the HMPs, which did not provide a clear understanding of the term or how it should be operationalized. Consider this statement from the 2015 *Portland and Multnomah County Climate Action Plan*: "Equity is achieved when all individuals have access to the opportunities necessary to satisfy their essential needs, advance their well-being and achieve their full potential

. . . Equity is both the means to healthy communities and an end that benefits us all . . . Climate Equity ensures the just distribution of the benefits of climate protection efforts and alleviates unequal burdens created by climate change. This requires intentional policies and projects that simultaneously address the effects of and the systems that perpetuate both climate change and inequity" (42). Further, this plan positioned equity within a framework of climate justice creating a thematically specific goal of 'climate equity.'

Suggested tools for building equity included better hazard preparedness for disadvantaged groups, neighborhood improvement projects, and anti-displacement planning approaches. This was evident in Lake Oswego's 2020 CAP, which recommended future development projects in flood-prone areas that account for vulnerable populations in ways that ensure urban growth does not create future climate inequities (42). Also, given these policies all had robust engagement with extreme heat and wildfire smoke, it is unsurprising that many of their equity-based strategies focused on these hazards (e.g., improve access for underserved groups to local shelter facilities that provide air filtration and cooling amenities). This is a significant point of departure from the HMPs, which paid limited attention to extreme heat and wildfire smoke and failed to adequately design equitable action strategies related to these threats. Also different from the HMPs were the creation of metrics to evaluate how each action step advances equity. At the time of its creation, the 2016 *Climate Action Through Equity* report clarified that "[Portland] and the County will develop climate-equity metrics to track the degree to which equity considerations are integrated into the decision-making processes and implementation of the Climate Action Plan . . ." (7). Also, Lake Oswego's plan assigned symbols for each of its action steps and used the initials "EQ" to reference whether a strategy addresses or improves equity.

Most of the plans attempted to create a timeline for the strategies they proposed, including those that are equity-based; that acknowledged, timelines were structured differently for each CAP with some using the rather broad categories of 'Near term,' 'Mid-term,' 'Long-term,' 'Uncertain,' or 'Currently Underway.' Other policies suggested strategies be implemented and/or completed by an arbitrary target date with the year 2050 commonly cited. Funding for the equity-based strategies was even less clear with vague allusions made to various government bodies at differing scales, although the 2015 *Portland and Multnomah County Climate Action Plan* referenced a few specific non-profits as potential revenue streams (e.g., the Bullitt

Foundation and Partners for Place). One reason why funding details might not have been more explicitly defined is that most of the CAPs offered few cost approximations for the equity-building projects they aspire to complete. An exception was the 2020 *Sustainability and Climate Action Plan for Lake Oswego*, which listed an estimated cost projection for each proposed action based on increments of $10,000. Finally, all of the plans highlighted active participation by community residents, leaders, and advocacy groups. Similar to the HMPs, participation was largely centered around a public review and comment process with a few of the policies claiming several of their strategies came from recommendations made by the public. Unlike the HMPs, the CAPs tended to have a greater representation of minorities and vulnerable groups on their steering and advisory committees. This might explain why the CAPs had more engagement with ideas meant to address community-specific inequities and underlying vulnerabilities.

c. Community Plans

Qualitative coding and analysis were performed on five community-authored texts published between 2011 and 2018 (Table 3). None of these documents focused on disaster events per se, although a few did address the effects of climate change and how these manifest in harmful ways for local communities. Since these documents were created by and for community residents, many of whom identify as being people of color, several focused on the ongoing and historical injustices experienced by Black neighborhoods; in addition, there was widespread recognition that many of Portland's private and public institutions are embedded in white supremacy, thus engendering an apathetic response towards transforming a status quo known to perpetuate inequities. These positions were strongly articulated in the 2018 *Afro-Ecology Movement Report* and 2017 *PAALF Peoples Plan*, which filter themes of resilience, community building, and racial equity through a prism of Black empowerment and liberatory practice. Other notable themes were climate justice, social and environmental justice, workers' rights, and community-based participation in research.

Plan Title	Plan Focus
2011 *East Portland Action Plan*	Improved livability; urban planning

2016 *Community-based Participatory Mapping: Collecting Neighborhood-level Data for Climate Action*	Climate change adaptation
2017 *Voz Climate Justice Plan*	Workers' rights
2017 *PAALF Peoples Plan*	Community resilience; justice-oriented planning
2018 *Afro-Ecology Movement Report*	Environmental and climate justice

Table 3. Community-authored texts in chronological order with their noted focus.

All of these texts were focused on neighborhoods and communities embedded within Portland city limits. While a few of the documents leveraged government resources or expertise, most reflected the exclusive efforts and voices of local non-profits, justice advocacy groups, and residents of the target communities. Examples included the Portland African American Leadership Forum, the Africa House, and Voz Workers' Rights and Education Project. Many of the strategies proposed by these texts demonstrated a high degree of cultural sensitivity – e.g., the *Afro-Ecology Movement Report* discussed the spiritual and physical healing capacities of culture-based gardening and cooking. Given the robust engagement these documents had with topics of equity, marginalization, resilience, and vulnerability, it was no surprise they made connections between underlying social conditions and why these are critically important drivers for why disadvantaged groups disproportionately experience the impacts of extreme weather events: ". . . the compounded impact of social and economic constraints experienced by day laborers also creates greater financial and health vulnerability when exposed to extreme heat conditions" (*Voz Climate Justice Plan*, 2017, 10).

While none of the documents focused extensively on hazard mitigation, there were still multiple discussions connected to sustainability, climate change, and environmental justice, all of which are frameworks that occasionally intersect with DDR strategies and hazard management. It is noteworthy, however, that the *PAALF Peoples Plan* called out associations between these frameworks and whiteness. For example: "In Portland, 'sustainability' has become synonymous with whiteness, privilege, and exclusion" (64). Extreme heat was one of the few climate hazards linked to the policy recommendations of these texts. Examples can be found in the *VOZ Climate*

Justice Plan which suggests: “Educate workers on identifying, preventing and treating . . . heat-related illness; Provide tools and training for self-advocacy around extreme heat exposure, including negotiation of fair wages for increased risk, breaks, and water; consider upgrades to [facilities] that provide relief from extreme heat” (11). Flooding and precipitation variability were two other important climate hazards addressed by these texts, both of which were discussed in detail in the 2016 report, *Community-based Participatory Mapping: Collecting Neighborhood-level Data for Climate Action*. Despite the absence of more substantive conversations around disaster management and hazard mitigation, these community-authored texts demonstrated the centrality of equity and justice in resident-led planning projects, especially those tied to migrants, the poor, and communities of color.

4 Discussion

4.a Compounding Disasters and Climate Change in Local Hazard Policies

Multi-risk scenarios that acknowledged the overlapping and compounding tendency of extreme weather events were conspicuously absent in the HMPs as was a clearly stated connection between weather-based hazards and climate change. As expected, all of the CAPs robustly engaged with the topic of climate change, presented ideas for lessening GHG emissions, and made connections between climatic drivers and extreme weather events. However, similar to the HMPs, local CAPs failed to give adequate attention to multi-hazard scenarios and demonstrated a dearth of planning and response strategies built around the latter; instead, their incorporation of compound events into policy remained largely conceptual and without a logistical framework to proactively plan for hazard combinations and their associated impacts. CPs did give some attention to climate change and the ways in which it threatens regional populations, although such discussion was mostly limited to impacts on workers and only considered heat, flooding and precipitation variability; compound events and hazard mitigation were not addressed. The failure of government- and community-authored plans to consider the interdependent and causally linked nature of many extreme weather events, as well as their inability to connect meaningful DDR activities to compounding and multi-hazard scenarios, suggests there is great potential to underestimate disaster threats and impacts in the Portland Metro region. This in turn means local communities are extremely vulnerable to and at risk of being underprepared for simultaneously occurring and overlapping hazards.

Local HMPs are profoundly disconnected from climate predictions and modeling and construct DDR planning and response protocols misaligned with forecasted hazard trends. This gap in knowledge undermines the effectiveness of HMPs since it creates a planning mindset focused on disasters that might be of lesser concern while at the same time ignoring hazards that are increasing in frequency, scale, and impact. Clark-Kinsberg, Easton-Calabria, and Patel (2021) link these asymmetries in hazard prioritization to the idea of 'disaster risk creation' where, ". . . dysfunctions within organizations can result in hazards being created, ignored and magnified, which can affect . . . the broader public" (449). An example of this can be seen in the preoccupation local HMPs have with flooding and the minimal attention they give to extreme heat, even though the frequency of severe flooding has steadily declined over the past decade while heat waves have become one of the most consequential and deadly hazards of recent years. In contrast, local CAPs have done a better job at interfacing planning goals with forecasted climate trends and hazard predictions. This speaks to differences in how HMPs and CAPs determine priorities – whereas HMPs formulate strategies based on past trends and significant historical events, CAPs use a forward-looking approach linked to future GHG emission scenarios and sophisticated climate models. Viewed thusly, it is fair to say HMPs must evolve and become more forward thinking in their assessment of potential hazards, lest they become static policies 'stuck in the past' incapable of effectively planning for the fullest range of potential disasters.

While it is encouraging to see regional planners draft CAPs to help identify the risks and potential hazards associated with climate change, not all planning regimes in the Portland Metro region have done so. Notably, Columbia and Yamhill counties did not have CAPs available for review, either at the municipal, county, or multi-jurisdictional levels. This deficiency might be due to a few reasons: first, Columbia and Yamhill counties are far less populous than the study area's other three counties (US Census Bureau, 2023) and therefore might lack the financial resources and institutional capacity needed to create a comprehensive CAP; second, these counties generally trend Republican in presidential and local elections (Oregon Secretary of State, 2022), a factor often associated with climate change not being considered or prioritized in planning goals (Kennedy and Tyson, 2024); and third, leaders and disaster managers in these locations may not view climate change as a key driver for the increasing frequency and intensity of certain hazards. Regardless of the reason(s), the absence of CAPs in Columbia and Yamhill counties limits an understanding of how extreme weather events are tied to dynamic and ever-

changing climatic drivers and, by extension, perpetuate planning goals and strategies out of touch with forecasted disaster trends. Such incomplete information erodes the effectiveness of DDR activities in these counties and increases the odds their communities will be dangerously underprepared for the hazards of tomorrow.

4.b The Political Economy of Local Hazard Policy: Vulnerability, Resilience, and Equity

Political economy is a useful theoretical lens through which many planning regimes and their activities can be evaluated (Beard and Sarmiento, 2014). Broadly speaking, political economy (PE) is a theoretical framework that examines the synergistic relationships between politics and economic systems (Mause, 2019; Peck and Tickell, 2002). It calls out and interrogates how political parties and actors influence markets and control capital flows and how the latter shapes government priorities and policy creation at all scales (Sovacool, Tan-Mullins and Abrahamse, 2018). PE also recognizes these relationships are not neutral and that political decisions concerning urban investment and disinvestment are contingent upon deeply entrenched power differentials (Goldstein and Mele, 2016) – in other words, powerful financial institutions, groups, and individuals leverage their economic might to sway governmental actors to advance goals that benefit capital elites, ensure the primacy of market-based interests, and work toward the privatization of public assets (Montgomery, 2016). Exorbitant campaign donations, predatory lobbying, commitments to fund pet projects, and lucrative kickbacks are just some of the tools employed by neoliberal agents seeking to control the political sphere (Cooper, Gulen and Ovtchinnikov, 2010; Rose-Ackerman and Palifka, 2016; Borisov, Goldman and Gupta, 2015). This is why political leaders and their agendas often reflect the interests of corporations and other financial entities rather than the priorities and needs of the communities they profess to serve (Molotch, 1976; Sovacool, Tan-Mullins, and Abrahamse, 2018).

Since HMPs and CAPs are byproducts of urban leaders and planning regimes, PE analysis can be an effective way to identify the ways in which these documents are shaped by politics and capital – that is to say, who is involved in their creation and who benefits from their policies. PE is also valuable in recognizing whether certain social dimensions are factored into DDR goals and how these are being incorporated into short- and long-term hazard planning strategies. Social vulnerability is one such dimension and speaks to how socioeconomic and demographic factors (e.g., poverty, race, lack of home ownership, etc.) make some groups and individuals more

susceptible to the shocks and stressors of climate change and natural disasters (Aksha et al., 2019). Unfortunately, the HMPs reviewed in this study consistently lacked any substantive connection between the historical, political, and social dynamics that are at the root of vulnerability. Also of note was the tendency of local HMPs to either collapse vulnerable population types into a single, broad category or omit them altogether, thus perpetuating a disaster management framework incapable of equitably serving at-risk individuals who require response strategies different from the mainstream population. Collectively, these shortcomings expose serious gaps in Portland Metro's DDR planning efforts, meaning that when local HMPs acknowledged vulnerability, they did so in a reactionary manner focused on minimizing hazard impacts, rather than initiating more productive discussions on why vulnerabilities exist in the first place and what measures might be the most effective in dismantling them. As a result, vulnerable communities in the Portland Metro region are likely to remain just that – *vulnerable*. Moreover, HMPs will continue to operate as 'symptom managers' in that their primary function is limited to cleaning up the aftermath of disasters. This leaves socially vulnerable communities locked in a cycle of experiencing disproportionate impacts with each new and overlapping hazard with no concrete strategies for tearing down the structural inequalities responsible for vulnerability. From a PE perspective, if urban leaders want to break this cycle, they must summon the political will necessary to sufficiently redirect resources from privileged groups and financial growth imperatives and toward poor and historically marginalized communities.

Another important social dimension of disaster management is resilience. The National Research Council (2012) defines hazard resilience as, ". . . the ability to prepare and plan for, absorb, recover from, and more successfully adapt to adverse events" (1). Within the context of this study, local HMPs and CAPs gave little attention to the concept of resilience, which suggests there might be theoretical and/or methodological confusion about the role of resilience in disaster management and community building. Another possibility is planners familiar with the concept might see resilience as merely an ancillary, consequential benefit of DDR that does not require more integrated assessment in planning strategies (e.g., coordinating disaster policies and management around resilience tools like Baseline Resilience Indicators for Communities (BRIC)). These unfortunate and rather narrow engagements preclude resilience from becoming a purposeful goal for disaster managers since it remains overlooked as a robust and meaningful metric for understanding which communities and demographics are more capable of resisting

and recovering from the stress points caused by climate change and extreme weather events. While this implies a need for resilience to be more than an aspirational planning tenet, a PE assessment requires careful consideration of the ways in which politics and neoliberal priorities might coopt efforts to use resilience strategies as a means of achieving just and transformational disaster policy. To this point, Ajibade (2022) warns against the pursuit of 'resilience fixes,' which further entrench uneven power relations, vulnerability, and structural inequalities by funneling economic resources into urban growth mandates and gentrifying investment schemes disguised as measures to advance community resilience.

Equity, a third important social dimension, was frequently discussed in all of the CAPs and CPs. Referenced multiple times in mission statements and action items, it is clear the authors recognized the value of equity as a normative and guiding principle for urban planning and social transformation. One reason why equity might have been a leading goal for these policy documents is that community representatives, non-profits, and social activists were heavily involved in designing them. In practice, this meant community representatives sat on steering and advisory committees where they served as policy co-authors and offered city and county planners constructive feedback. Moreover, community participants were chosen with diversity in mind and reflected a broad range of residents along lines of race, gender and socioeconomic standing. This focus on inclusion and fair representation ensured equity was more than an abstract talking point disconnected from how real people affected by disasters frame the concept; rather, it ensured equity goals were established by community members instead of bureaucrats and financial actors, the idea being that hazard policies and risk assessment strategies were constructed with equity at the forefront and in sync with the unique needs of the region's socioeconomically and racially marginalized populations.

Juxtaposed to CPs and CAPs, considerations of equity and justice were often lacking or poorly articulated in regional HMPs. The latter seemed to favor a 'control and command' blueprint for policy design where power and final decision-making fell within the purview of planning experts, and no space was made for shared governance in respect to community representation. Viewed through a PE lens, HMPs in the Portland Metro region therefore operate as exclusionary spaces under the control of planning offices tethered to neoliberal growth logic; this bodes poorly for historically marginalized populations since equity in the context of disaster management

remains subordinate to economic actors seeking to profit from hazard risk and impacts. In order to steer toward a more inclusive, emancipatory style of policy creation, it is critical local HMPs find meaningful ways to encourage and support the participation of underserved groups in formulating equitable DDR strategies. By doing so, Portland Metro's planners and leaders can better serve the needs of a population base projected to become more culturally and racially diverse in the decades to come (Lechner, 2024). This last sentiment resonates for the single yet powerful reason that even though non-Whites bear the brunt of hazard impacts, Brown and Black populations continue to be disempowered and disenfranchised from Portland's disaster planning regime, which heavily favors technocratic strategies disconnected from the concerns and voices of the city's communities of color. Understanding and confronting this reality not only elevates the priorities of these groups, it also positions them as leaders in disaster management efforts. This 'flipping the script,' which centers the needs of communities of color and the poor while simultaneously reducing the influence of growth-driven bureaucrats, opens more inclusive planning spaces that embrace justice- and equity-oriented metrics, tools, and analysis.

5 Conclusion

Climate change is necessitating a paradigm shift in how governments and communities plan for and respond to natural hazards. Disaster-based science, which has traditionally dealt with extreme weather events as isolated phenomena, must adapt its analytical tools and scope of inquiry to more rigorously interrogate the multiple combinations and sequences of climatic drivers that feed into high-impact hazard events, many of which are co-occurring, overlapping and/or trigger a cascade of other disasters. As identified in Portland Metro's HMPs, a preoccupation with historical trends and outdated case studies illustrates how local hazard planning efforts tend to be activities anchored in the past as opposed to being forward-thinking and anticipatory. Regional disaster management experts, therefore, must urgently recalibrate their goals and priorities to better account for compounding and climate-driven risk scenarios. CAPs, in contrast, have done an excellent job with incorporating climate predictions and hazard modeling to forecast future disaster trends; they also have demonstrated a better grasp on the frequently dependent nature of weather-based hazards by using a multivariate perspective that recognizes chains of interconnected risk (e.g., the con-contributive nature of extreme heat, drought, wildfire, and deadly air quality).

While it might seem adequate to simply laud CAPs for their engagement with climate models and multi-risk scenarios while simultaneously criticizing HMPs for their failure to do so, the significant priority differences between these policy types require deeper scrutiny of local leaders and planners who have failed to integrate these two areas of hazard expertise. That is to say, hazard mitigation and climate action professionals currently occupy disparate and compartmentalized spaces in regional municipal and county offices. This system of fractured expertise engenders discontinuities and inefficiencies in local planning departments and magnifies the risk and impacts communities face from natural disasters. If DDR managers and climate action advocates wish to truly fulfill their mission of keeping people safe, they must adopt a collaborative, integrative, and holistic approach to risk assessment and hazard planning that encourages their professionals to work toward unified goals. Expressed differently, HMPs and CAPs should not be distinct policies pursuing different priorities. Instead, disaster experts should draw upon state-of-the-art climate science and partner with climate action experts to draft '*Climate*' Hazard Mitigation Plans (CHMPs). As policy instruments, CHMPs would collapse two presently separate and isolated areas of expertise into one disaster management agency functioning under the coordinated guidance of both DDR and climate change specialists. Having better knowledge synchronization between these fields repositions the priorities of emergency operations managers and DDR experts such that they are proactively and intentionally addressing multi-risk scenarios arising from climate influenced weather hazards. It also ensures they are better informed as to forecasted disaster trends and how these are likely to impact the Portland Metro region in the near and extended future.

CAPs represent an encouraging shift toward inclusive and equity-driven policies. However, there is still much work to be done as these plans do not go far enough in addressing the structural inequalities and longstanding social vulnerabilities that cause marginalized communities to be disproportionately impacted by extreme weather events. HMPs are even further behind the curve given their lack of community representation and conspicuous absence of equity-based risk assessment and planning. One way of improving these shortcomings might be for government-authored policies to make better use of the tools available to them – for example, social vulnerability indexes (SoVI) and Baseline Resilience Indicators for Communities (BRIC) can help planners identify which communities are most at risk of hazard impacts due to the ability of these social science tools to make areas of high social vulnerability

and low resilience spatially visible. Additionally, 'Equity Evaluation Tools' like those used by Loh and Kim (2020) can be used by local hazard specialists to "identif[y] vulnerable people and geographic areas and ensure equitable protection from hazards and the equitable distribution of amenities" (181). Ultimately, utilizing and having proficiency in these tools can help shift planning mindsets such that vulnerable communities and those tagged as having low resilience are seen as spaces of opportunity for 'transformational disaster management,' meaning they become focal points for investment and resource allocation done in the pursuit of redressing historical inequalities. Under this new vision, city planners, social scientists, climate change experts, and DDR professionals can present a unified front in actualizing transformative change that dismantles inequitable disaster management practices and replaces these with projects and programs that protect all peoples. The authors and participants of local CPs could help support this vision by leveraging their involvement in grass-roots activism to place pressure on municipal and county leaders to pursue more justice-oriented forms of hazard management.

In summary, regional HMPs and CAPs both make contributions to disaster planning and risk assessment. That stated both policy types have flaws that need to be addressed in order to more comprehensively keep all people safe from the impacts of climate change and extreme weather. CPs, while lacking substantive engagement with disaster mitigation, did showcase how inclusive representation can create policies that elevate the voices of Portland Metro's diverse populations. Yet questions remain as to how CPs can jump scale from neighborhood activism to influence local governments' approach to DDR projects. Additionally, it should be noted the most recent policies reviewed for this study are from 2020-21, meaning some municipal and county offices have already authored the next generation of disaster management plans. Therefore, other scholars have an opportunity to build upon the findings of this research to see how newer HMPs and CAPs are addressing topics of equity, vulnerability, resilience, climate change, and compounding disasters. Fresh research can reveal if there have been improvements in these areas or if planners are still falling short. Given the state of urgency presented by climate change, this author hopes planners in the Portland Metro region are indeed mindful of these topics and working on new and novel ways to promote socially just and equitable forms of hazard management.

Footnotes:

[1] There is a Columbia County in both Oregon and Washington; our analysis only included Columbia County, Oregon

[2] For clarification, the city of Lake Oswego extends into Clackamas, Multnomah, and Washington counties, although most of its territory is situated in Clackamas County

Appendix I

List of Government and Community Authored Plans with Contact Information

Hazard Mitigation Plans

1. 2014 Columbia County Multi-Jurisdictional Hazard Mitigation Plan

https://www.co.columbia.or.us/files/emergency_management/2014_updated_basic_plan_-_columbia_county_mhmp_8-19_upload_to_web.pdf

https://www.columbiacountyor.gov/departments/EmergencyManagement

2. 2014 Columbia County Multi-Jurisdictional Hazard Mitigation Plan

https://www.co.columbia.or.us/files/emergency_management/2014_updated_basic_plan_-_columbia_county_mhmp_8-19_upload_to_web.pdf

https://www.columbiacountyor.gov/departments/EmergencyManagement

3. 2016 City of Tigard Natural Hazards Mitigation Plan

https://scholarsbank.uoregon.edu/xmlui/bitstream/handle/1794/7753/Tigard_Hazard_Mitigation_Plan.pdf?sequence=1&isAllowed=y

https://www.tigard-or.gov/your-government/departments/public-works/emergency-management

4. 2017 Washington County Emergency Operations Plan

https://www.washingtoncountyor.gov/emergency/documents/eop-basic-plan/download?inline

https://www.washingtoncountyor.gov/emergency

5. 2017 Washington County Natural Hazard Mitigation Plan

https://s3.amazonaws.com/washcomultimedia/CAOAudio/Natural+Hazard+Mitigation+Plan+2016.pdf

https://www.washingtoncountyor.gov/emergency

6. 2017 Clackamas County Emergency Operations Plan

https://www.washingtoncountyor.gov/emergency/documents/eop-basic-plan/download?inline

https://www.clackamas.us/dm

7. 2017 Multnomah County Multi-Jurisdictional Natural Hazards Mitigation Plan

https://multco-web7-psh-files-usw2.s3-us-west-2.amazonaws.com/s3fs-public/Approved_2017_MC_MJ_NHMP.pdf

https://www.multco.us/em

8. 2018 City of Portland Resilience Infrastructure Planning Exercise

https://www.portland.gov/bps/climate-action/documents/resilient-infrastructure-planning-exercise-summary-report-2018/download

https://www.portland.gov/bps/climate-action/documents

9. 2019 Envisioning Governance for Urban Resilience, Portland OR

https://sustainability-innovation.asu.edu/urbanresilience/wp-content/uploads/sites/4/2020/02/portland-workshop-1-report.pdf

https://sustainability-innovation.asu.edu/urbanresilience/

10. 2019 Clackamas County Multi-Jurisdictional Hazard Mitigation Plan

https://dochub.clackamas.us/documents/drupal/94d47d86-9389-4a4c-9f79-8ba0e1d75f7f

https://www.clackamas.us/dm

11. 2020 Yamhill County Multi-Jurisdictional Hazard Mitigation Plan Update

https://www.mcminnvilleoregon.gov/sites/default/files/fileattachments/fire/page/853/yamhill_county_mnhmp_-_2020_update.pdf

https://yamhillcounty.gov/160/Emergency-Management

12. 2020 Beaverton Natural Hazards Mitigation Plan

https://beavertonoregon.gov/712/Beaverton-Natural-Hazards-Mitigation-Pla

https://beavertonoregon.gov/592/Emergency-Management

13. 2021 City of Portland Floodplain Resilience Plan Discussion Draft

https://efiles.portlandoregon.gov/record/14741975

https://www.portland.gov/bps/planning/

Climate Action Plans

1. 2015 Portland and Multnomah County Climate Action Plan

https://www.multco.us/sustainability/2015-climate-action-plan

https://www.multco.us/sustainability

2. 2016 City of Portland Climate Action Through Equity

https://www.portland.gov/bps/climate-action/documents/climate-action-through-equity-2016/download

https://www.portland.gov/bps/climate-action

3. 2017 Portland-Multnomah County Climate Action Plan Progress Report

https://www.multco.us/sustainability/climate-action-plan-progress-report-2017

https://www.multco.us/sustainability

4. 2019 Beaverton Climate Action Plan

https://content.civicplus.com/api/assets/9bd12401-c855-43f5-8b2e-1975ec930d05

https://www.beavertonoregon.gov/540/Climate-Action-Task-Force

5. 2020 Lake Oswego Climate Action Plan

https://www.ci.oswego.or.us/sites/default/files/fileattachments/Final%20Compiled%20SCAP.pdf

https://www.ci.oswego.or.us/sustainability/sustainability-action-plan-city-operations

Community Plans

1. 2011 East Portland Action Plan

https://www.portland.gov/omf/brfs/grants/epap/documents/epap-action-plan-march-10-2011/download

https://www.portland.gov/omf/brfs/grants/epap

2. 2016 Community-based Participatory Mapping: Collecting Neighborhood-level Data for Climate Action

Document no longer available online; contact author for copy @ clower@pdx.edu

3. 2017 Voz Climate Justice Plan

https://www.portland.gov/bps/climate-action/documents/voz-environment-and-justice-framework-2017/download

https://www.portland.gov/bps/climate-action

4. 2017 PAALF Peoples Plan

https://www.imagineblack.org/peoples-plan

https://www.imagineblack.org/our-vision

5. 2018 Afro-Ecology Movement Report

https://static1.squarespace.com/static/5c1ad1377106994934ad2548/t/5ffcc10116297a0746cddbec/1610400014489/Afro-Ecology+Report_Final+2020+%281%29.pdf

https://irco.org/locations/africa-house/

References

Adams-Fuller, T. “Extreme heat is deadlier than hurricanes, floods and tornadoes combined,” *Scientific American*, (2023), https://www.scientificamerican.com/article/extreme-heat-is-deadlier-than-hurricanes-floods-and-tornadoes-combined/

Aksha, S. K., Juran, L., Resler, L. M., and Zhang, Y. (2019). An analysis of social vulnerability to natural hazards in Nepal using a modified social vulnerability index. *International Journal of Disaster Risk Science*, *10*(1), 103-116.

Alvarez, M.K. and Cardenas, K. (2019). Evicting slums, ‘building back better’: Resiliency revanchism and disaster risk management in Manila, *International Journal of Urban and Regional Research*, *43*(2), 227-249.

Beard, V. A., and Sarmiento, C. S. (2014). Planning, Public Participation, and Money Politics in Santa Ana (CA). *Journal of the American Planning Association*, *80*(2), 168–181.

Berke, P. R., and Godschalk, D. (2009). Searching for the good plan: A meta-analysis of plan quality studies. *Journal of Planning Literature*, *23*(3), 227–240.

Berke, P., Yu, S., Malecha, M., and Cooper, J. (2019). Plans that disrupt development: Equity policies and social vulnerability in six coastal cities. *Journal of Planning Education and Research*, *43*(1), 150-165.

Borisov, A., Goldman, E., and Gupta, N. (2015). The Corporate value of (corrupt) lobbying. *Review of Financial Studies*, *29*(2015), 1039–1071.

Chen, J., and Greenberg, M. (2021). Cascading hazards and hazard mitigation plans: Preventing cascading events in the United States. *Risk, Hazards & Crisis in Public Policy*, *13*(1), 48-63.

Clark-Ginsberg, A., Easton-Calabria, L. C., and Patel, S. S. (2021). When disaster management agencies create disaster risk: A case study of the US’s Federal Emergency Management Agency. *Disaster Prevention and Management*, *30*(15), 447-461.

Collins, T.W. and Jimenez, A.M. (2016). “The neoliberal production of vulnerability and unequal risk,” in Dooling, S. (Ed.), *Cities, Nature and Development* (pp. 62-81). Routledge.

Cooper, M. J., Gulen, H., and Ovtchinnikov, A. (2010). Corporate political contributions and stock returns. *The Journal of Finance*, *65*(2), 687-724.

Cutter, S. (2018). Compound, cascading, or complex disasters: What's in a name? *Environment: Science and Policy for Sustainable Development*, *60*(6), 16–25. doi.org/10.1080/00139157.2018.1517518

de Ruiter, M.,C., Couasnon, A., van den,Homberg, M. J. C., Daniell, J. E., Gill, J. C., & Ward, P. J. (2020). Why We Can No Longer Ignore Consecutive Disasters. *Earth's Future*, *8*(3).

Department of Environmental Quality. (2023). Wildfire smoke trends and the Air Quality Index. *Oregon Department of Environmental Quality*. https://www.oregon.gov/deq/wildfires/Documents/WildfireSmokeTrendsReport.pdf

Douris, J., and Kim, G. (2021). *The atlas of mortality and economic losses from weather, climate and water extremes (1970 – 2019)* (Publication No. WMO-1267). World Meteorological Association. WMO Atlas of Mortality and Economic Losses from Weather, Climate and Water Extremes (1970–2019) (WMO-No. 1267). https://library.wmo.int/viewer/57564/?offset=#page=1&viewer=picture&o=bookmarks&n=0&q=

Intergovernmental Panel on Climate Change. (2018). Global Warming of 1.5 ◦ C: An IPCC Special Report on the Impacts of Global Warming of 1.5 ◦ C Above Pre- Industrial Levels. http://www.ipcc.ch/report/sr15/.

Islam, N. S., and Winkel, J. (2017). Climate change and social inequality. *United Nations Department of Economic & Social Affairs Working Paper*, *152*. https://bhekisisa.org/wp-content/uploads/2023/09/wp152_2017.pdf

FEMA. (2021). Portland lowers flood risk and insurance rates. *Federal Emergency Management Administration*. https://www.fema.gov/case-study/portland-lowers-flood-risk-and-insurance-rates.

FEMA. (2022). State Mitigation Planning Key Topics Bulletins: Planning. *Federal Emergency Management Administration*. https://www.fema.gov/sites/default/files/documents/fema_state-mitigation-planning-key-topics-bulletin-planning-process_2022.pdf

FEMA. (2024). Oregon severe storms, flooding, landslides, and mudslides. *Federal Emergency Management Administration*. https://www.fema.gov/locations/oregon.

Fox, N., Tilt, J. H., Ruggiero, P., Stanton, K., and Bolte, J. (2023). Toward equitable coastal community resilience: Incorporating principles of equity and justice in coastal hazard adaptation. *Cambridge Prisms: Coastal Futures*, *1*(e36). doi: 10.1017/cft.2023.24.

Goldstein, B. T., and Mele, C. (2016). Governance within public-private partnerships and the politics of urban development. *Space & Polity*, *20*(2), 194-211.

Hu, Q., Tang, Z., Zhang, L., Xu, Y. and Wu, X. (2018). Evaluating climate change adaptation efforts on the US 50 states' hazard mitigation plans. *Natural Hazards*, *92*(2), 783-804.

Johnson N. J., Svara J. H. (2014). Social equity in American society and public administration. In Johnson N. J., Svara J. H. (Eds.), *Justice for all: Promoting social equity in public administration* (pp. 3-25). Routledge.

Kennedy, B., and Tyson, A. "How Republicans view climate change and energy issues," *Pew Research Center*, (2024), https://www.pewresearch.org/short-reads/2024/03/01/how-republicans-view-climate-change-and-energy-issues/.

Kim, H., and Marcouiller, D. W. (2018). Mitigating flood risk and enhancing community resilience to natural disasters: Plan quality matters. *Environmental Hazards*, *17*(5), 397-417.

Kohon, K. N., Tanaka, K., Himes, D., Toda, E., Carder, P. C., Carlson, B. (2023). Extreme heat vulnerability among older adults: A multilevel risk index for Portland, Oregon. *The Gerontologist*, 64(3), 1-10.

Lawton, J. "Leveraging federal post-disaster recovery reform for extreme heat adaptation and innovation," *Federation of American Scientists*, (2024), https://fas.org/publication/extreme-heat-stafford-update/.

Lechner, J. (2024). "Racial diversity in Oregon," *Oregon Office of Economic Analysis*. https://oregoneconomicanalysis.com/2024/03/06/racial-diversity-in-oregon/

Loh, C. G., and Kim, R. (2020). Are we planning for equity? Equity goals and recommendations in local comprehensive plans. *Journal of the American Planning Association, 87*(2), 181-196.

Mause, K. “Political Economy,” in *Encyclopedia of Law & Economics*, edited by Alain Marciano and Giovanni B. Ramello (Springer, 2019), 1599-1606.

Meerow, S., and Ladd, K. (2022). Planning for extreme heat. *Journal of the American Planning Association*, *88*(3), 319-336.

Molotch, H. (1976). The city as a growth machine: Toward a political economy of place.” *American Journal of Sociology*, *82*(2), 309–32.

Montgomery, A. (2016). Reappearance of the public: Placemaking, minoritization and resistance in Detroit. *International Journal of Urban and Regional Research*, *40*(4), 776-799.

Multnomah County (2022). Health impacts from excessive heat events in Multnomah County, Oregon, 2021. https://multco-web7-psh-files-usw2.s3-us-west-2.amazonaws.com/s3fs-public/20220624_final-heat-report-2021_SmallFile-2.pdf.

National Research Council. “Summary” In *Disaster Resilience: A National Imperative*. (National Academies Press, 2012), 1-10. doi.org/10.17226/13457.

Nori-Sarma, A., Milando, C., Weinberger, K. R., Hess, J. J., Errett, N. A., and Wellenius, G. A. (2022). Association between the 2021 heat wave in Portland, Oregon, and Seattle, Washington, and emergency department visits. *JAMA, 328*(23): 2360-2362.

Oregon Secretary of State. (2022). “Election History.” Accessed March 18, 2024. https://sos.oregon.gov/elections/Pages/electionhistory.aspx.

Peck, J., and Tickell, A. (2002). Neoliberalizing space. *Antipode*, *34*(3), 380-404.

Pescaroli, G., Suppasri, A., and Galbusera, L. (2024). Progressing the research on systemic risk, cascading disasters, and compound events. *Progress in Disaster Science*, *22*, 100319.

Philip, S. Y., Kew, S. F., van Oldenborgh, G. J., Anslow, F. S., Seneviratne, S. I., Vautard, R., Coumou, D., Ebi, K. L., Arrighi, J., Singh, R., van Aalst, M., Pereira Marghidan, C., Wehner, M., Yang, W., Li, S., Schumacher, D. L., Hauser, M., Bonnet, R., Luu, L. N., Lehner, F., Gillett, N., Tradowsky, J. S., Vecchi, G. A., Rodell, C., Stull, R. B., Howard, R., and Otto, F. E. L. (2022). Rapid attribution analysis of the extraordinary heat wave on the Pacific coast of the US and Canada in June 2021. *Earth System Dynamics*, *13*, 1689–1713.

Rose-Ackerman and Palifka, B. “Corruption in procurement and privatization,” In *Corruption and Government*, 2nd ed. (Cambridge University Press, 2016), 93-125

Russell, E., Loikith, P., Ajibade, J., Done, J. M., and Lower, C. (2024). The meteorology and impacts of the September 2020 Western United States extreme weather event. *Weather and Climate Extremes*, *43*, 100647.

Sovacool, B. K., Tan-Mullins, M., and Abrahamse, W. (2018). Bloated bodies and broken bricks: Power, ecology, and inequality in the political economy of natural disaster recovery. *World Development*, *110*(2018), 243-255.

Stults, M. (2017). Integrating climate change into hazard mitigation planning: Opportunities and examples in practice. *Climate Risk Management*, *17*, 21-34.

Thomas, V. (2017). Climate change and natural disasters: Transforming economies and policies for a sustainable future. Routledge.

Trenga, C.A. (2023). Air Quality and Asthma-like Illness in Oregon during Wildfires. Centers for Disease Control and Prevention. https://www.cdc.gov/nssp/success-s tories/Air-Quality-and-Asthma-like-Illness-in-Oregon-During-Wildfires.html.

Urness, Z. “Grim ‘new normal’? Oregon wildfires lay waste to 826,000 acres, set records for unhealthy air in 2021,” *Oregon Statesman Journal*, October 11, 2021, https://www.statesmanjournal.com/story/news/2021/10/09/oregon-wildfires-burn-826-000-acres-torch-174-homes-2021-season/6010810001/.

U.S. Census Bureau. (2023). “U.S. Census Bureau quickfacts: Oregon.” Accessed March 18, 2024. https://www.census.gov/quickfacts/fact/table/OR/PST045223.

Vitolo, C., Di Napoli, C., Di Giuseppe, F., Cloke, H. L., and Pappenberger, F. (2019). Mapping combined wildfire and heat stress hazards to improve evidence-based decision making. *Environment International*, *127*, 21-34.

Zscheischler, J., Westra, S., van den Hurk, B.J.J.M., Seneviratne, S. I., Ward, P. J., Pitman, A., AghaKouchak, A., Bresch, D. N., Leonard, M., Wahl, T., and Xuebin Zhang (2018). Future climate risk from compound events. *Nature Climate Change*, *8*, 469–477.