A NORTHEAST SAFE & THRIVING FOR ALL

NEST

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Climate Adaptation Partnerships Planning Grant

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AU | ANTIOCH UNIVERSITY NEW ENGLAND
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EXECUTIVE SUMMARY

Motivations

The Upper Northeast of the United States is increasingly perceived as a "climate haven" as climate change and other pressures stress other parts of the country and the world. Projections of how many people might move and when are still highly uncertain, challenging the ability of state and local governments to plan effectively. Climate impacts in the region (especially sea-level rise) will also induce internal migration and greater competition for comparatively safer and better resourced neighborhoods. Significant population shifts in the region could therefore lead to gentrification, displacement, xenophobia, and social conflict. At the same time, in-migration from climate change and other drivers also can revitalize a region once dominated by 20th century industries and natural resource-based economies by providing much needed people, revenues, and investments.

A Northeast Safe and Thriving for All (NEST) examines the potential for and implications of climate-exacerbated migration to and within the Upper Northeast. The project, funded by a one-year planning grant from the National Oceanographic and Atmospheric Administration (NOAA) Climate Adaptation Partnerships (CAP) program, explores how a CAP would help the region navigate climate impacts and societal transitions. NEST defines the "Upper Northeast" as including the states of Maine, New Hampshire, and Vermont, as well as western Massachusetts, and upstate New York. NEST is led by researchers at Cornell University and Antioch University New England in collaboration with researchers and practitioners in the region (see list of participants).

MOTIVATIONS

- A Northeast Safe and Thriving for All (NEST) examines the potential for and implications of climate-exacerbated migration to and within the Upper Northeast

KEY FINDINGS

- Environmental risks and disasters are one of many reasons – especially jobs and family – that motivate people to move.
- The Northeast must address drivers of existing vulnerability – especially housing supply, quality, and affordability – while anticipating changing demographic trends

Roadmap for an Upper Northeast Climate Adaptation Partnership

- We see an opportunity for a regional Climate Adaptation Partnership to help the Upper Northeast build sufficient affordable, accessible, safe, efficient, and resilient housing; adapt current economic development strategies; and welcome new in-migrants.

NEST broadened climate adaptation planning beyond risk mitigation and infrastructure resilience. We considered how migration has shaped communities in the region in the past, and how class and race (among other factors) affect the region's cultural identity, sense of place, socioeconomic vulnerabilities, and preparedness for future demographic change. We also examined challenges and opportunities for the Upper Northeast given climate-related migration and the governance gaps of managing such a demographic shift. We asked:

1. What forms of climate migration exist in the region?

2. How do class, race, Tribal status, political ideology, and residency status (rural/urban, local/part-time) shape vulnerability to and perceptions of climate migration? What issues and aspects of equity, justice, and repair do different groups identify as important for climate migration planning to consider?

3. To what extent do climate policy, planning, and implementation initiatives in the region address migration needs, threats, and opportunities?

4. What regional governance gaps inhibit efforts to support climate migration that is just and equitable? How might a regional science-policy/practice network meet these gaps?

NEST Project

We reviewed the literature on climate migration, migration trends in the Northeast, and case studies of specific communities' experiences with different types of migration. In addition, we conducted three levels of engagement: internal team workshops, sub-regional listening sessions, and region-wide presentation and feedback.[1]

1. In January 2023, we held two half-day internal workshops to strengthen interdisciplinary understanding and communication. These workshops helped our multi-disciplinary team better understand each other's perspectives and bridge divides between research and practice. The University of New Hampshire's PowerPlay theater ensemble engaged the team with a performance of "Undercurrents" followed by a facilitated conversation that helped develop our capacity to engage each other in difficult conversations. This prepared us to better engage external stakeholders in conversations about climate-related migration.

2. From March to April, NEST convened four sub-regional workshops (Coastal Maine and New Hampshire, Connecticut River Valley of New Hampshire and Vermont, Rustbelt region of Upstate New York, and the City of Buffalo, New York). Ranging from 1.5 hours to a whole day, these workshops included presentations and world cafe exercises asking participants to react to future scenarios and propose responses. We shared summary briefings with participants and regional partners.

3. In May, we organized the bi-annual Local Solutions Conference[2] at Antioch University New England with the theme of Climate Migration. We presented NEST research and findings in a plenary, then engaged participants in a world cafe, soliciting feedback on who needs to be part of planning for climate migration, the equity implications of climate migration, and opportunities for regional responses.

Based on the thematic concerns participants

1 Sub-regional reports and presentations can be found on the NEST project website: https://labs.aap.cornell.edu/node/733

2 The conference website can be found here: https://communityresilience-center.org/conferences/2023-local-solutions-climate-migration

identified, we reviewed state climate plans in the areas of housing, transportation, economic development, energy, equity, and governance for how much they consider issues of climate change, adaptation, and migration. The report that follows distills each of these research components: 1) Drivers and Patterns of Climate Migration in the U.S.; 2) Histories of Climate Migration in the Northeast; 3) Themes from Stakeholder Workshops; 4) Review of State Enabling Policies; and 5) a Roadmap for an Upper Northeast Climate Adaptation Partnership. Below, we summarize key findings and recommendations for future action.

Key Findings

Our review of climate migration literature shows that **environmental risks and disasters are one of many reasons – especially jobs and family – that motivate people to move.** Although the Northeast is rated as far more resilient and has lower disaster damages than most regions of the country, people continue to move to some of the least resilient and most hazard-prone parts of the United States as well as flood prone parts of the Upper Northeast. When climate impacts will reach a tipping point and cause greater movements to the Northeast remains highly uncertain because projections are difficult to model and limited to single hazards like sea level rise. Nevertheless, while the Upper Northeast (excluding New York City and Boston) lost population between 2010-2020, some communities are seeing significant growth pressures from businesses, remote workers, amenity migrants, and pandemic / disaster-related movers. For these groups, the Upper Northeast exhibits favorable environmental and social conditions, such as more moderate climate impacts, an abundance of land and freshwater resources, higher infrastructural carrying capacity, and comparatively affordable housing.

The history of migration shows that **the intersection of environmental quality, housing conditions, and broader societal economic shifts can result in major demographic changes in the Upper Northeast.** Dramatic movements and fluctuations in population, from Indigenous seasonal migration, to colonization and genocide, the Great In-Migrations of French Canadians and African Americans, to deindustrialization, suggest that major changes are possible and hard to predict. For half a century, most communities in the region (especially in rural areas) have lost population, leading to declines in housing quality, jobs, services, and governance capacity. In a context of limited housing stock, recent refugee resettlement, amenity migration, COVID-19, local flooding, and climate-exacerbated disasters elsewhere, have brought housing competition, gentrification, and social and cultural conflicts to urban and amenity-rich municipalities in the region. Some of the biggest housing pressures are in the region's coastal and riverine communities that also face significant climate risks. While urban and rural municipalities face divergent needs, lessons from history underscore the need to address climate impacts and climate-related migration from intersectional and integrated approaches.

Our workshops with 300 stakeholders around the region reinforced historic lessons: **the Northeast must address drivers of existing vulnerability – especially housing supply, quality, and affordability – while anticipating changing demographic trends.** Workshop attendees – who included state, regional, and local government employees, housing, environment, community, and refugee resettlement advocates, businesses, and academics – made clear that there are opportunities for the region to be more welcoming and caring of people with low-incomes, children or elder care needs, or who

are racialized minorities. Providing adequate levels of affordable housing, health care, infrastructure, and social inclusion for existing residents would help the region become welcoming to others. At present, quality affordable housing is a major constraint for attracting a much-needed workforce – including for resettling refugees, retaining youth, and capitalizing on emergent economic opportunities (e.g., around decarbonization). In the absence of coordinated planning and action, this constraint is likely to increase in the future.

There are significant opportunities for states to coordinate disparate efforts around greenhouse gas mitigation and decarbonization, infrastructure resiliency, housing access, economic opportunity, and social justice. States in the region have demonstrated leadership on climate mitigation, but progress on climate adaptation planning and attention to climate displacement, relocation, and migration is still emerging. Existing state climate plans emphasize the adaptation of infrastructure and economic activities over other key sectors that stakeholders identified as essential to inclusive, just, and livable cities: healthy, affordable, and safe housing; access to child, elder, and health care; good quality jobs; and services promoting a sense of belonging. For instance, most state climate action plans address energy efficiency, green buildings, and weatherization, but pay less attention to how to promote sufficient affordable housing away from flood prone areas to serve existing and future residents. At the same time, some states (particularly Vermont and Maine) and local governments have worked hard to equitably sustain community health, housing, and food security and welcome new migrants. This suggests that there are opportunities for shared learning and inclusive planning if state and local governments explicitly acknowledge and plan for these needs.

Finally, while stakeholders widely recognized the need for sub-state and multi-state regional collaboration and coordination, they also highlighted that **the Northeast's governance systems often constrain local, regional, and state governments from addressing these gaps.** The region is famous for its small and highly fragmented local governments, some of whom have only volunteer elected officials and staff. Many such communities, especially in rural areas, lack capacity to grapple with the intersectional challenges of climate change and housing, as well as the ability to engage in difficult, emotional conversations around migration and its implications. However, despite a strong sense of localism that can be in conflict with regionalizing capacity, several regional initiatives for climate adaptation have emerged, connecting the New Hampshire-Maine coastal zone, the New Hampshire-Vermont river valley, and the Buffalo-Rochester metro region. These networks, and the NEST project, provide foundations for a region of connected sub-regions that promote climate adaptation planning and implementation.

Roadmap for an Upper Northeast Climate Adaptation Partnership (CAP)

Based on this analysis and input from workshop participants, we see an opportunity for a regional Climate Adaptation Partnership to help the Upper Northeast build sufficient affordable, accessible, safe, efficient, and resilient housing; adapt current economic development strategies; and welcome new in-migrants. First, a CAP could conduct policy-relevant research on climate migration and projections, typologies of community adaptation conditions and responses, and support multi-site policy experimentation, monitoring, and evaluation to enable evidence-based learning. Second,

a CAP could play a bridging role in convening diverse actors. This could include connecting existing sub-regional adaptation networks to promote learning and exchange, linking existing topical research centers to support intersectional and transformative adaptation, connecting discordant or siloed sectors, and building adaptation leadership and continuing education among professionals. Third, a CAP could provide the research and evidence base for creating new institutional arrangements given rural and small town capacity limitations, such as regional tax sharing programs, regional utilities, or state housing mobility programs to adapt to sea level rise. Finally, a CAP as an entity could pursue funding on behalf of the region's smaller networks and organizations, and promote economies of scale in grant applications and knowledge sharing. The final section of the report details these possibilities.

In short, climate impacts portend complex changes in the region through direct impacts and cascading effects. This is particularly true when it comes to the intersectional issues around climate-related migration within, as well as into and out of, the Upper Northeast region. This NEST planning grant has crystallized an understanding among experts and practitioners in the region that there is a need for more attention to this issue – and that local and state governments have agency inshaping their futures.

Drivers and Potential of Climate Migration in the U.S.

From homes engulfed by wildfire flames in the West to entire neighborhoods wiped away by flood waters in the South, images and stories of American lives affected by climate change have become the norm. Climate change impacts are categorized as slow-onset impacts (including temperature changes, sea level rise (SLR), and desertification) and sudden-onset or disaster events (such as hurricanes, wildfires, flooding, and storm surges). Slow-onset air and water temperature changes combined with sea level rise increase the frequency and severity of sudden-onset events such as hurricanes. The United States' vast geography and its longitudinal and latitudinal location, make it prone to a multitude of disasters such as hurricanes and storm surges in the South and East, tornadoes in the Midwest, and wildfires in the Northwest and West. Both types of climate change impacts and their combined effects have already begun to dictate which U.S. geographies are perceived as marginally safer and more habitable. Compared to climate outlooks projected for the rest of the United States, the Northeast is generally well positioned to be an attractive place to live (climatically) for years to come. An abundance of fresh water resources and lower annual temperatures will likely continue to attract populations seeking out relatively safer and more habitable destinations.

However, despite growing recognition in international research agendas and policy discussions that most people displaced by climate change will move within their home countries rather than across borders (Rigaud et al., 2018), the way in which climate change might contribute to domestic population shifts has only just begun to be prioritized in the United States. The focus of the Biden Administration's 2021 "Report on the Impact of Climate Change on Migration" is primarily on global climate migration dynamics that could contribute to U.S.-bound immigration. However the report acknowledges that climate migration will also occur within U.S. borders and emphasizes the importance of investing in disaster risk reduction and local adaptation measures (White House, 2021). Additionally, Chapter One of the Fourth National Climate Assessment highlights that "climate change is transforming where and how we live" and directly connects the warming atmosphere to environmental changes that affect Americans' communities and livelihoods (Jay et al., 2018). Beyond federal policy circles, journalists have stepped in to bring to life the emotional process of deciding to leave home after a natural disaster through heart-wrenching stories of Americans on the move, such as in Abrahm Lustgarten's "How Climate Migration Will Reshape America" for the *New York Times Magazine* in 2020 and Jake Bittle's book, *The Great Displacement: Climate Change and the Next American Migration* (2023).

The following section presents the limited but growing body of empirical evidence about how climate change has and is projected to contribute to internal migration in the United States. Importantly, the evidence about why and how Americans move due to climate change supports the premise of the NEST project that the Northeast will likely gain population as climate migrants seek out relatively safer, more habitable, places to live in the coming decades. However, projections as to how many people would move, when, and where remain limited and uncertain.

What is climate migration?

Environmental conditions have always contributed to where people live, and climate change has already begun to influence where people live across the world. While climate plays a very direct role in forcing populations to relocate in the case of small island states, in most geographies around the world, the relationship between climate change and human mobility is less clear. The International Migration Organization's (IOM) 2019 G*lossary on Migration* defines climate migration as,

> the movement of a person or groups of persons who, predominantly for reasons of sudden or progressive change in the environment due to climate change, are obliged to leave their habitual place of residence, or choose to do so, either temporarily or permanently, within a State or across an international border.

Although there is growing recognition by international organizations and in domestic and international policy discussions that climate change induces migration, there currently is no legally protected status for "climate migrants," or international relocation pathways for those who have lost property or an income source due to climate change. In fact, this is often confused by the media and civil society's usage of the term "climate refugee," which is a misnomer that incorrectly suggests that protection under the 1951 Refugee Convention applies to those displaced by climate change. International protection mechanisms still do not exist because the extent to which climate and environmental stress contribute to human mobility is nuanced and contentious. When climate change affects a community whether as slow or sudden onset events, migration is just one of many adaptation measures a household might pursue (Cattaneo et al., 2019). In most instances, it is an option of last resort taken when other in-place adaptation options, such as alternative farming methods or resilient infrastructure-building, have failed or are otherwise not possible.

Even when a household decides to relocate, in most cases climate is considered more of an indirect driver that exacerbates other "push" factors including social, economic, and political stressors (Black et al., 2011). The type of climate stress, whether it is sudden or slow onset, and its amplification of other stressors, such as loss of income and property, shelter, or social and economic safety nets, result in diverse migration responses (Cattaneo et al., 2019). As the IOM definition suggests, the "climate migration" umbrella includes a spectrum of short- or long-term and even circular responses; at times movements are short-distance across towns but can also be long-distance moves across regions or nations, and range from individual household relocation to wide-scale community displacement. Similarly, climate can also act as a "pull" factor, influencing where households decide to resettle based on perceptions of habitability, climate safety, and environmental resource availability. While the relationship between how climate might draw people into a place is even less clear than how it might push people out, it is rarely the only factor calculated by households in choosing relocation destinations. Like any choice to move, where people resettle is largely dependent on personal and context-specific considerations, such as "kin networks, employment opportunities, amenities (both natural and economic), and economic vitality" of the destination (Hauer, 2017).

Aside from the individual or household decision to move, the "climate migration" umbrella also includes the phenomenon of "managed retreat," which refers to "the purposeful, coordinated movement of people

and assets out of harm's way" (Siders, 2019). A more expansive definition offered by Georgetown Climate Center's Managed Retreat Toolkit, explains that,

> under the best of circumstances, managed retreat is the coordinated process of voluntarily and equitably relocating people, structures, and infrastructure away from vulnerable coastal areas in response to episodic or chronic threats in order to facilitate the transition of individual people, communities, and ecosystems (both species and habitats) inland.

Regardless of differences in stipulated definitions, the use of federal funding to coordinate the movement of multiple homes, structures, and ecosystems distinguishes "managed retreat" as a subcategory of climate migration in the U.S. It is a risk-reduction strategy that has primarily been explored in response to SLR and flood exposure along coastlines and other types of floodplains, with opportunity for transference to areas facing other climate risks, such as wildfire.

How have people moved in response to climate change?

Similar to other places in the world, climate-related out-migration in the United States correlates with places that will experience a higher frequency of sudden-onset events or disasters such as hurricanes (and related flooding) and wildfires, and places that will experience severe slow-onset events such as sea level rise, extreme temperatures, or prolonged flood periods. The former has received the most academic attention, particularly in the aftermath of Hurricane Katrina, from scholars who have examined how disaster-prone areas might experience population declines. While some disaster victims choose to move, like all forms of migration, disaster displacement is highly dependent on "existing physical and social vulnerabilities, and policy measures taken, or not taken, to mitigate, prepare for, and respond to disaster impacts" (Perls, 2020). For this reason, Perls (2020) suggests that sudden-onset or disaster-induced migration in the United States should be understood along a spectrum of "forced" to "voluntary" movement. Another way to conceptualize this spectrum is through direct and indirect drivers. In some cases, the disaster's destruction of shelter and property directly induces the need to relocate, whereas in others the local economic impact and perception of future disaster risk encourage out-migration (Boustan et al., 2022; Cattaneo et al., 2019; Rubin and Won-Parodi, 2022). In all cases, the frequency of disasters and their severity can impact the decision to move or to remain in place (Sheldon and Zhan, 2022; Boustan et al., 2022; Cattaneo et al., 2019).

Despite the challenges in predicting who moves and how they move in a disaster's aftermath, a few attempts have been made to map the relationship between disasters and out-migration in the U.S. The Displacement Risk Index built by Esnard et al. (2011), examined hurricane-related displacement risk in Gulf Coast states including South and North Carolina. Combining social and physical environmental risk indicators, the study confirmed that coastal communities in the region are the most likely to experience displacement in the aftermath of a hurricane, with the most high risk counties found in Florida compared to the other seven states in the study area. However, most moves are localized rather than long-distance. Eliott and Wang (2023) find that on average recipients of floodplain buyouts move only eight miles away. Additionally, survey evidence has also been used

to identify key disaster-related out-migration or population decline hotspots such as in California and Colorado's wildfire zones (Rubin and Won-Parodi, 2022; Winkler and Rouleau, 2020; Nawrotzki et al., 2013). These studies confirm the salience of future wildfire risk perception as a key variable in determining who moves and who doesn't in the aftermath of a wildfire. Importantly, Rubin and Won-Parodi (2022) explain that intentions to migrate were associated with personal experience with fire and smoke which informed higher perceptions of future risk. The impact of personal experience with a previous disaster on the decision to move is corroborated by Sheldon and Zhan (2022). These results suggest that out-migration due to disasters can be expected from areas that have previously been along a direct disaster path, rather than from surrounding or peripheral regions that *might* experience disasters in the future.

Similar to sudden-onset or disaster-related out-migration, slow-onset climate impacts can act as a direct or indirect driver of household choices to relocate. For some population groups (particularly high-skilled workers and the elderly), temperature changes at home directly shape the decision to leave (Fan et al., 2018), whereas others are motivated to relocate in search of job opportunities in the face of declining economic activities at home due to climate change (Feng et al., 2012). The latter is expected to be particularly detrimental to sectors that are directly reliant on environmental amenities such as the agriculture sector. Fen et al. (2012) determined that crop yield decreases due to climate change in the Corn Belt could lead to an out-migration of 3.7% of the adult population in rural agricultural communities in the medium term.

A handful of studies have attempted to isolate the impact of specific slow-onset climate push factors to build an anticipated geography of out-migration. For instance, Hauer (2017) isolates the impacts of 1.8m sea-level rise on U.S. internal migration flows, finding that the East Coast states of Delaware, Connecticut, Massachusetts, South Carolina, Virginia, New Jersey, Florida, and Louisiana and California on the West Coast, could all see net population losses, with Florida facing the most extreme declines. Beyond sea-level rise, long-term changes in weather patterns, including increasing or decreasing average temperatures and precipitation, is expected to impact population shares across the U.S. When overlaying projected temperature extremes with projected migration data under different scenarios, Fan et al. (2018: 646) finds that climate-change-induced migration would lead to "population gains in the Northeast region, West region, and California regions at the expense of the South and Midwest regions."

Where are comparatively safer places people may want to live?

Although it is inaccurate to say that any place will be free from the impacts of climate change, some places in the United States will fare worse than others. Globally, annual average temperatures have increased by about 1.2°F (0.65°C) from 1901 to 2016. The three hottest record breaking years were 2014-2016 consecutively and looking at long term patterns (Hayhoe et al., 2018). The Sun Belt region has felt the brunt of these impacts. In mid-July, 2023, more than 40 million people were under heat alerts from California to Florida (Gray, 2023). As of July 26, 2023, Phoenix, Arizona endured 27 consecutive days above 110°F (43°C) with temperatures remaining above 90 degrees at night since July 9th. From April to August, 2023, there have already been 39 heat associated deaths in Phoenix alone (Cervantes, 2023).

Figure 1: FEMA National Risk Index

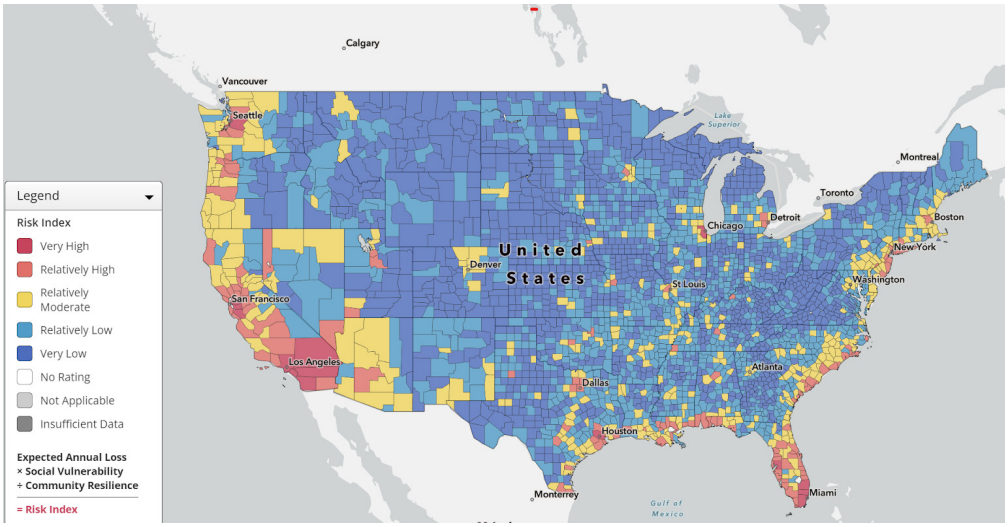

Figure 1.1: Mapped county and census tract data indicating risk, where risk is calculated by multiplying Expected Annual Losses by Community Risk Factor (Social Vulnerability divided by Community Resilience).

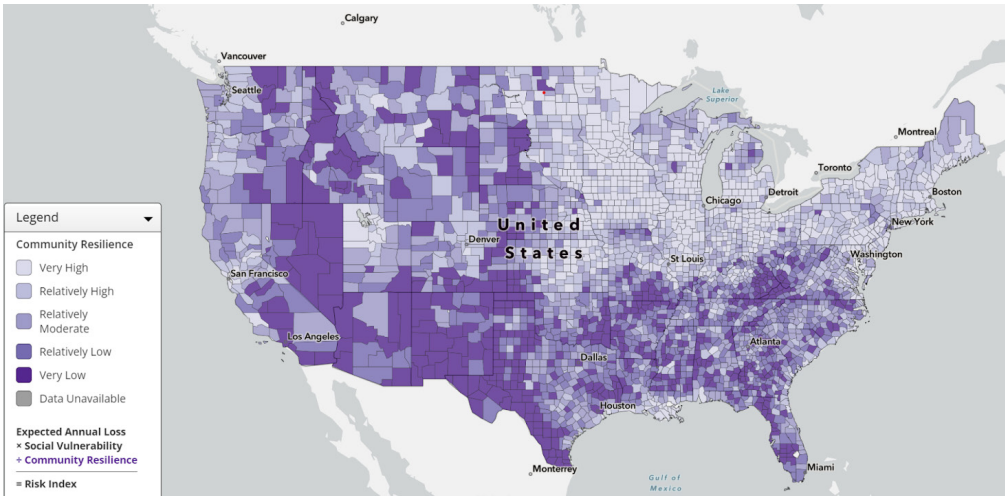

Figure 1.2: Mapped county and census tract data indicating Community Resilience, where Community Resilience is understood as the national ranking of a community's "ability to prepare for anticipated natural hazards, adapt to changing conditions, and withstand and recover rapidly from disruptions" (FEMA, 2023).

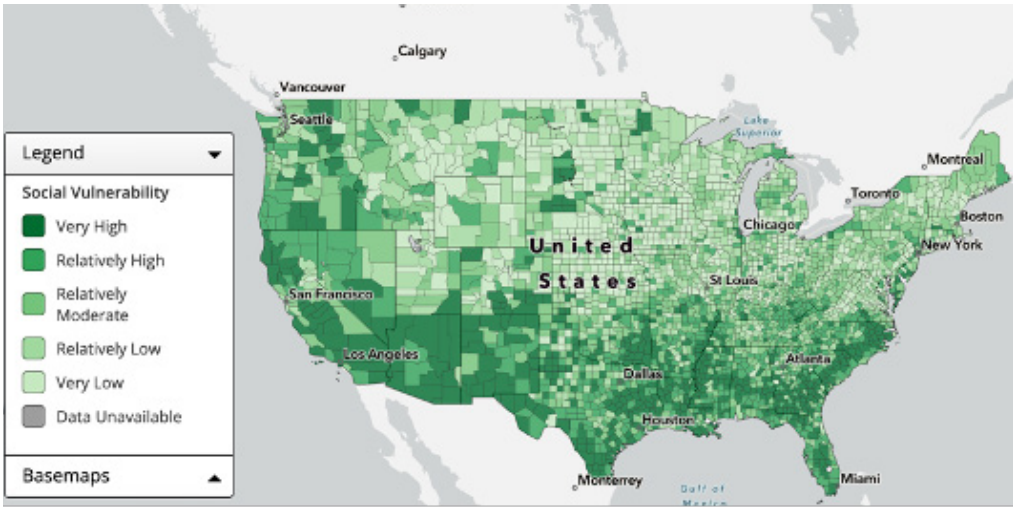

Figure 1.3: Mapped county and census tract data indicating Social Vulnerability, where Social Vulnerability is understood as the national ranking or percentile of "the susceptibility of social groups to the adverse impacts of natural hazards, including disproportionate death, injury, loss, or disruption of livelihood" (FEMA, 2023).

Aside from rising temperatures, coastal communities across the U.S. are threatened by SLR, which is having serious implications on the infrastructure, housing, and economic activities of coastal regions. By the year 2100, 3ft of SLR will affect an additional 4.2 million people, with almost half of the at-risk population currently living in Florida (NOAA, n.d.). Although all U.S. coastal regions are affected by SLR, some will face more extreme effects than others. According to Sweet et al. (2017), the Northeast Atlantic Ocean and the Western Gulf of Mexico will experience the highest SLR in the U.S., which is also projected to be higher than the global average of approximately 0.21 inches per year under almost all global mean SLR scenarios. Under the more probable sea level rise scenarios—the intermediate-low and intermediate scenarios from a recent federal interagency SLR report project sea level rise of 2 feet and 4.5 feet (0.6 m and 1.4 m) on average in the Northeast by 2100, with worst case scenarios projecting closer to 11 feet (3m) of sea level rise by the end of the century (Dupigny-Giroux, et al. 2018). Large metropolitan areas like New York and Boston will likely build walls and other large infrastructure to keep the sea out but most other communities along the shore will be able to afford such extreme measures. Many communities are going to find themselves facing hard decisions about when to move, where to move, and what to do next as tidal and storm surge flooding moves closer to their front door.

Figure 2: EPA Cumulative Resilience Screening Index

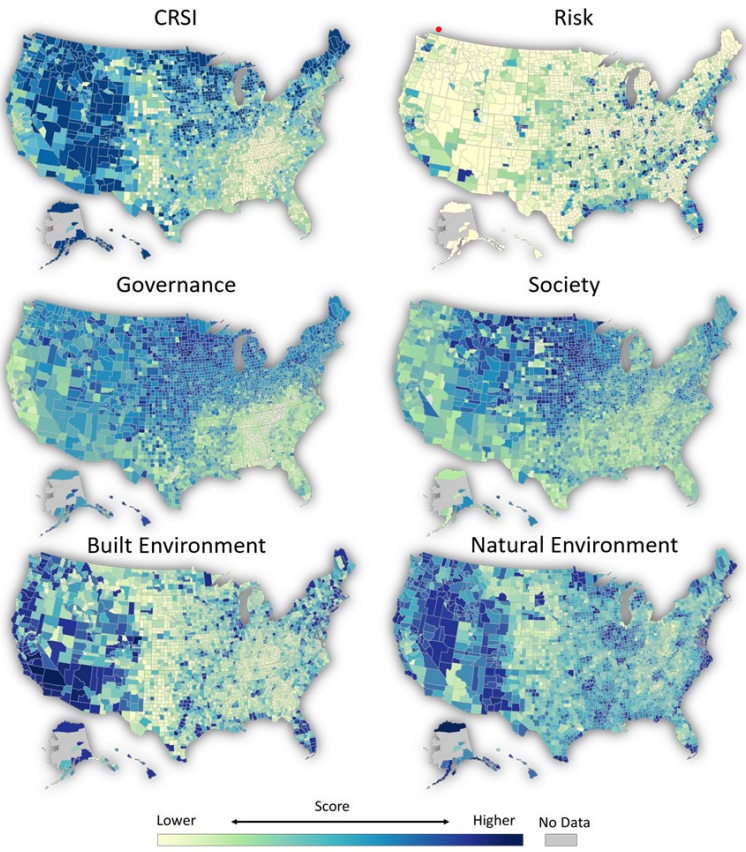

Figure E-3 The distribution of CSRI values and domain scores (Risk, Governance, Society, Built Environmental, and Natural Environmental)

Figure 2. Overall, many counties across the Northeast receive a high CRSI score over all, which corresponds with low risk, and high governance, built and natural environmental, and societal resilience. Notably, coastal regions in Massachusetts, New Hampshire, and Maine, demonstrate higher climate risk which corresponds with a lower overall CSRI score.

Source: EPA Climate Resilience Screening Index

Natural disasters such as wildfires, hurricanes, and flood events, have both increased in frequency, severity, and impact. Since 1980, NOAA reports that there have been 360 disasters that have had economic costs of $1 billion or more, with 43% of those disasters occurring in the last decade alone (the economic costs for each disaster have been consumer price index adjusted). The number of billion-dollar disasters has risen steadily since the turn of the century, averaging 6.7 per year in the 2000s, to 12.8 per year in the 2010s, and about 20 per year since 2020 (Smith, 2023). Hurricanes remain the costliest and the deadliest natural disaster faced by US communities, increasing from an average of 6.7 per year in the 2000s, to 13.1 per year in the 2010s, to 18 per year since 2020 (NCEI, 2023). Beyond extreme weather events, wildfires have also increased in frequency and impact due to climate change (Zhuang et al., 2021). The EPA reports that the 10 highest acres-burned wildfire events on record all have

Figure 3: Population Change Across US Counties from 2010 to 2020

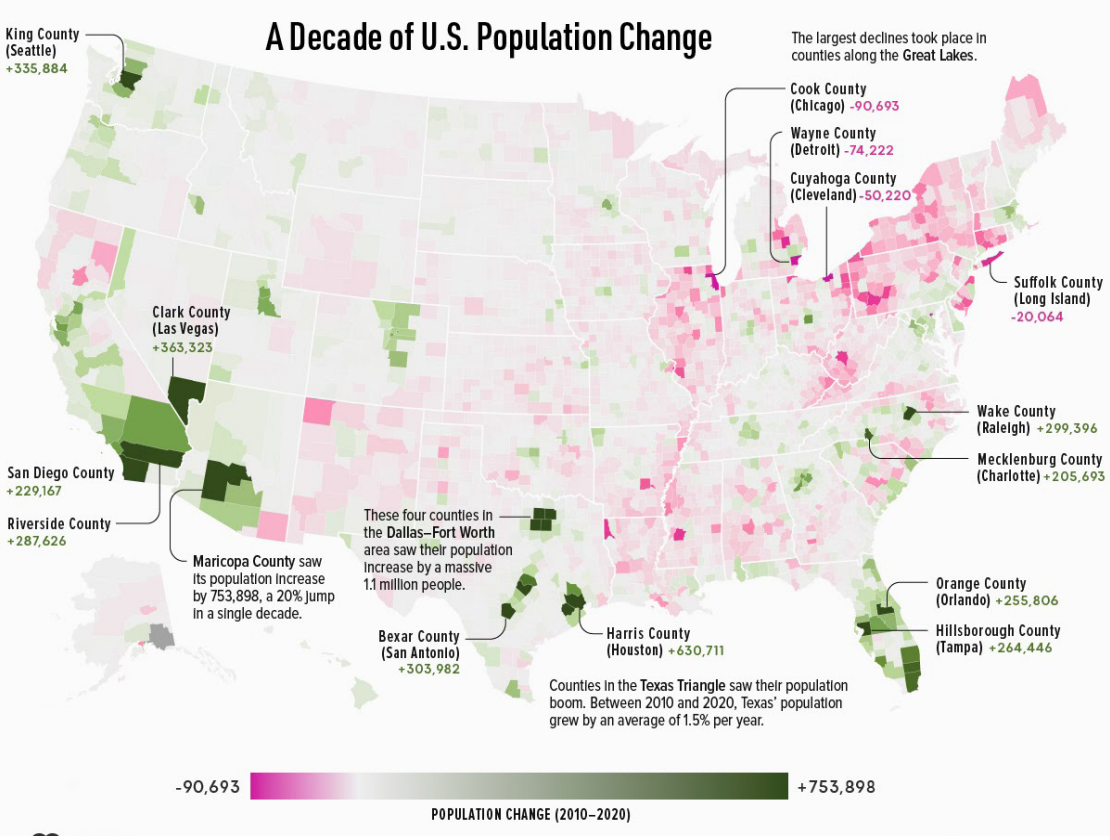

Figure 3. In the last decade, urban counties primarily in the southern tier of the US saw population growth at the expense of the Northeast region and rural regions across the country. Although it is the opposite of what might be expected, when comparing this map with Figure 1.1, the counties that have gained population appear to almost directly align with the counties marked by "Very High" risk by FEMA's National Risk Index.

Source: US Census Bureau, USAFacts; Visualization by Routley, N. (2022, June 16). Mapped: A Decade of Population Growth and Decline in U.S. Counties. Visual Capitalist. https://www.visualcapitalist.com/mapping-a-decade-of-us-population-growth/

occurred since 2004, which have also coincided with the hottest spring and summer temperatures on record. Yet, the exposure to natural disasters and vulnerability to disaster impacts, including economic, human life, and built and natural environment impacts, are not evenly distributed across the US and are highly dependent on geographic location. As will be discussed later in this section, many U.S. geographies such as Florida and Texas, are not only more exposed to natural disasters but also have less ability to cope with disaster impacts.

In light of these climate challenges facing the rest of the U.S., the Northeast is still considered one of the least at-risk regions to natural hazards and best suited to cope with climate change impacts. For instance, FEMA's National Risk Index ranks most Northeastern counties as either "Relatively Low Risk" or "Very Low Risk." This index defines "risk" as " the potential for negative impacts as a result of a natural hazard" in which risk is comprised of three variables: (1) economic losses due to the natural hazard; (2) social vulnerability to the hazard; and (3) community resilience, or the ability to prepare for, adapt, and recover from natural hazards (FEMA, 2023). The Northeast scored particularly well in the Community Resilience category compared to the southeast and western parts of the United

Figure 4: Types of Receiving Communities

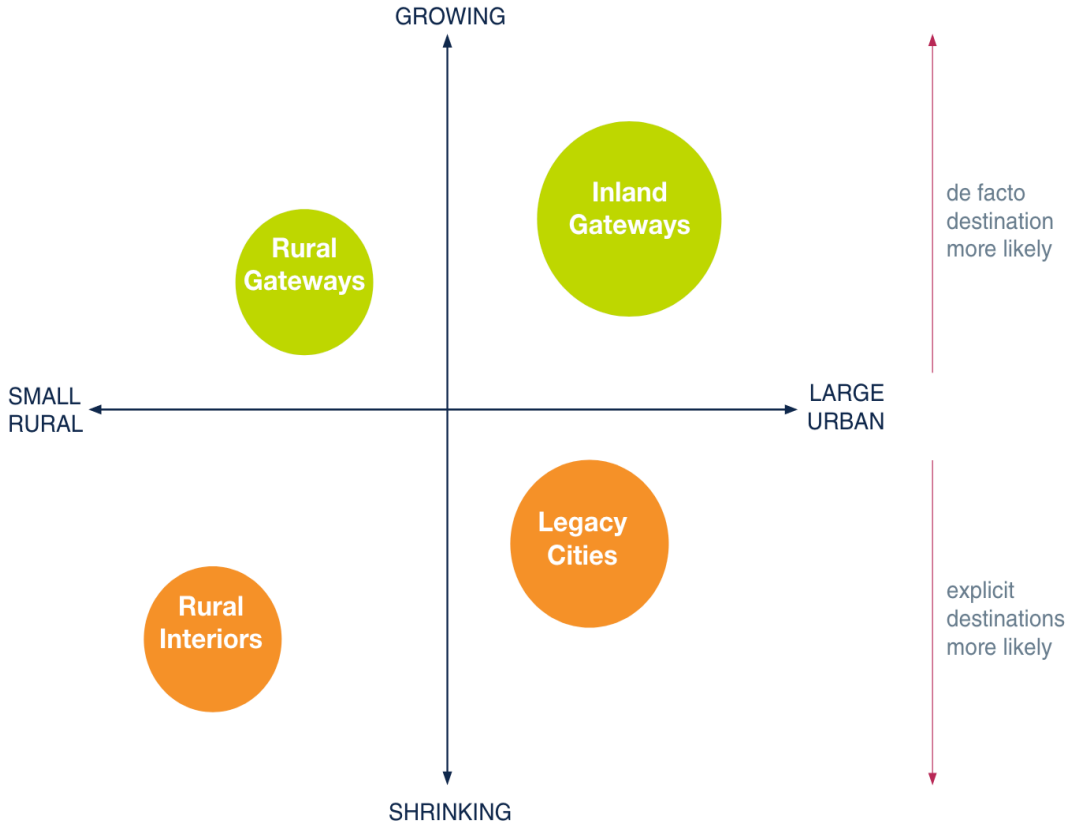

Figure 4, Source: Teicher, H. M., & Marchman, P. (2023). Integration as Adaptation: Advancing Research and Practice for Inclusive Climate Receiving Communities. Journal of the American Planning Association, 0(0), 1–20. https://doi.org/10.1080/01944363.2023.2188242

States, where many counties are categorized as “Relatively Low” and “Very Low.” Similarly, the Northeast receives a high resilience score from the EPA’s Cumulative Resilience Screening Index (CRSI) which defines resilience as a “characteristic in human and natural systems exhibiting a capacity to withstand and recover from an adverse shock or event (Summers et al., 2017). Based on county level data from 2000 to 2015, the Northeast has higher CSRI scores across climate risk, governance, society, built environment, and natural environment indicators compared to many other U.S. counties. The CSRI cites natural resource conservation, local demographics, and the stewardship of vacant structures as important contributors to the region’s resiliency (Summers et al., 2017). Areas with lower resilience scores were again concentrated in the southeast, western Midwest and southwestern Texas.

Where are people currently moving?

Interestingly, current population growth trends demonstrate that more people are moving to places that have been identified as at-risk for climate impacts than moving out of them or to other places that are identified as less at-risk (Mirandi and Leilani Main, 2020). Much of the population growth in the last decade has been in the Sun Belt’s large metropolitan areas of Atlanta, Las Vegas, and Austin (Fulton et al., 2020) and coastal cities, such as Miami-Fort Lauderdale and West Palm Beach (Collins et al., 2018). Between 2010 and 2016, almost half of all population growth in the nation occurred in the 22 metro areas in the Sun Belt (Olin, 2020). Currently, 50% of the population of the U.S. lives in the Sun Belt and this number is expected to increase to 55% by 2030 (Wang & Laumont, 2019).This trend less than intuitive trend is further confirmed when U.S. census national population growth data is compared to FEMA’s National Risk Index (Figure 2). Places and regions that the Index has identified as high risk to natural hazards, which primarily fall in the southern tier of the United States (including Southern California, Texas, and Florida), are also seeing population growth and higher rates of urbanization. These migration trends are reflective of the fact that although climate might be growing in relevance to relocation choices, people largely settle in places based on economic opportunity or existing familial or kinship networks (Hauer, 2017).

While COVID-19 related population movement, economic stress, and rising housing prices in the last two years have counteracted some of the patterns from the last decade (Teicher and Marchman, 2023), scholars have offered explanations for why such trends seem so counter-intuitive. Importantly, environmental amenities such as bodies of water and forests that make attractive living locations, are the same features that have the potential to become threats to well-being in the face of climate change (Clark et al., 2022). In other words, climate change has and will flip environmental amenities to “disamenities” or threats, in certain regions (Winkler and Rouleau, 2021). A recent study that examined the combined weight of natural disasters on migration decisions, found that out-migration across U.S. counties is correlated with hurricane risk and heat waves but that more people are actually moving into wildfire zones, than out of them (Clark et al., 2022). This was explained by the appeal of water bodies and forest cover that outweighs considerations of wildfire risk. The same trend holds when examining how thew risk of certain slow-onset events impact migration decisions. The most obvious example of this is the continued allure of coastal living, despite communicated risks of storm surges and flooding (Mirandi and Main, 2021). Fan and Davlasheridze (2015) indicate that despite public information campaigns about the

heightened potential for flooding, “amenity value seems to dominate flood risk, especially in coastal regions” for home buyers across the U.S.

Where are people anticipated to move to in the face of climate change?

Just as climate can act as a push factor, it can also act as a pull factor. While scholarship on climate as a pull factor isn’t nearly as robust, there is growing evidence to suggest the role of climate in shaping where people are choosing to move to, despite overall population growth trends. Importantly, much of this literature involves future projections about population growth in certain areas, for community planning purposes. Media narratives about self-branded “climate havens’’ and academic warnings about wide scale population shifts in the long-term have begun to emerge. Just as heterogeneity exists between sending locations and among migration responses, receiving locations will also vary in their willingness and ability to absorb in-migrants. A few conceptualizations of climate migration destinations have been offered. Mirandi and Main (2021) propose a useful typology under the assumption that urban areas will be the most likely receiving locations, distinguishing between “unsuspecting and unwilling” recipient cities and “climate destinations,” or as Teicher and Marchman (2023) phrase as “de facto” versus “explicit” destinations. The key difference is that there are and will be some places that absorb people primarily due to their proximity to natural hazard zones and there are and will be others that intentionally craft themselves as environmentally safe and welcoming to newcomers to encourage population growth.

Two insights into how people move in the face of natural hazards, regardless of whether they have been displaced by sudden or slow-onset events, shape the expected geography of “de facto” climate migration receiving locations. The first is that households tend to relocate a relatively short distance, at least in the short-term (Groen and Polivka, 2005; Nawrotzki et al., 2014). The second is that particular groups that have been directly impacted by the environmental hazard actively select destinations that are deemed marginally safer (Sheldon and Zhan, 2021; Mirandi and Main, 2021; Elliott and Wang, 2023). As a result of these dynamics, there are two types of locations that have been deemed the most likely and appealing destinations for climate migrants: (1) “rural gateways” and (2) mid-size to large inland urban settings (Teicher and Marchman, 2023). The former refers to rural communities that are highly connected to environmental amenities, many of which have seen growing populations for the past five years and particularly since the COVID-19 pandemic. Teicher and Marchman (2023) predict that given these trends, rural gateways will continue to see in-migrants, including those relocating for climate reasons, supported by some of the previously presented empirical evidence about current relocation choices that prioritize environmental amenities.

Inland urban settings have received the most empirical attention as climate migration receiving communities, particularly in the context of disaster displacement. As one of the most prominent examples of disaster-induced displacement in U.S. history, the outcomes of Hurricane Katrina relocation choices confirm that over 60% of evacuees from Mississippi and Louisiana who permanently resettled after the hurricane remained within their home state (Groen and Polivka, 2005). In the years since Katrina, those who have chosen to leave New Orleans due to disaster risk “prefer close destinations to distant ones, and tend toward large, economically strong counties rather than rural ones with fewer economic prospects” (Eyer et al., 2018). The

preference for short-distance relocation seems to hold regardless of which type of disaster induces the displacement, evidenced by fire migrants in Colorado in 2010 (Nawrotzki et al., 2014) and in California in 2018 (Mirandi and Main, 2021).

Beyond the disaster context, there have been some attempts to indicate a geography of receiving locations based on slow-onset events. For instance, Hauer (2017) predicts that inland urban centers of "Austin Texas, Orlando Florida, Atlanta Georgia, and Houston Texas could see more than 250,000 previously unforeseen future SLR net migrants." Again, what makes these cities the "de facto" choice among households choosing to relocate due to sea-level rise, is their relative closeness to the coastal region and their inland locations which are perceived to be safer by households who experienced coastal hurricanes and flooding. Another study that examines the number of counties across the US that could experience in-migration due to SLR by Robinson et al. (2020) contributes projections specific to the East Coast. This study corroborates Hauer's findings, confirming that "all counties adjacent to coastal counties on the East coast" will experience the "indirect" effects of SLR, which are defined as "the increased population pressures due to heightened inflows of climate migrants." The study also finds that urban areas in relatively close proximity to the East Coast will be the most attractive destinations for those relocating from coastal communities.

While some locations will inevitably become receiving communities, others have become so by design. Self-branded "climate havens," a term first coined by a *New York Times* article in 2019, are typically legacy cities that have harnessed their relative climate advantage for their own self-promotion in order to foster population growth (Mirandi and Main, 2021). While more research needs to be done to understand the variety of places that might find this strategy appealing, Mirandi and Main (2021) synthesize commonalities among current prescribed climate havens, as urban centers that tend to have:

1. "More manageable climate impacts, namely, are not prone to sea level rise or wildfires and prolonged heat waves;

2. Ready access to fresh water supply;

3. High vacancy rates or abundance of affordable housing;

4. Post-industrial, legacy cities with high infrastructural capacity (originally designed to support several thousand more residents than currently live there) (Pierre-Louis, 2019; Dagenais, 2019; Rossi 2019);

5. An expressed desire to grow and be welcoming;

6. History of or interest in improving adaptive capacity through sustainability or resilience efforts."

Myriad strategies have been employed to achieve the climate haven public image, ranging from explicit "place branding" in media and politics as in the case of Buffalo, NY and Duluth, MN to strategic economic development policies (Mirandi and Main, 2021, Teicher and Marchman, 2023). Importantly, places that this strategy appeals to are those that have been facing population decline for many decades as well as the social and economic problems that result from a shrinking tax base. The Northeast is home to many of these types of communities. New York Rust Belt cities like Buffalo and Rochester have infrastructure capacity that outsizes their current populations and with this, an apparent overabundance of available housing (Pierre-Louis, 2019; Gilbert, 2020). What's less obvious is that the majority of this infrastructure

is outdated, facing quality and safety challenges, with anticipated costs of making current vacant housing habitable upwards of a billion dollars in present-day costs for Buffalo alone (czb LLC, 2017). These pre-existing conditions and pressures will impact capacity to adequately serve and integrate newcomers, which will be explored further in the next section of this report.

The Northeast Must Plan for Interregional and Intraregional Climate Migration and Managed Retreat

Despite having a relatively lower risk to natural hazards compared to other U.S. regions (FEMA

Figure 5: Regional Percentage Population Change from 1980 to 2021

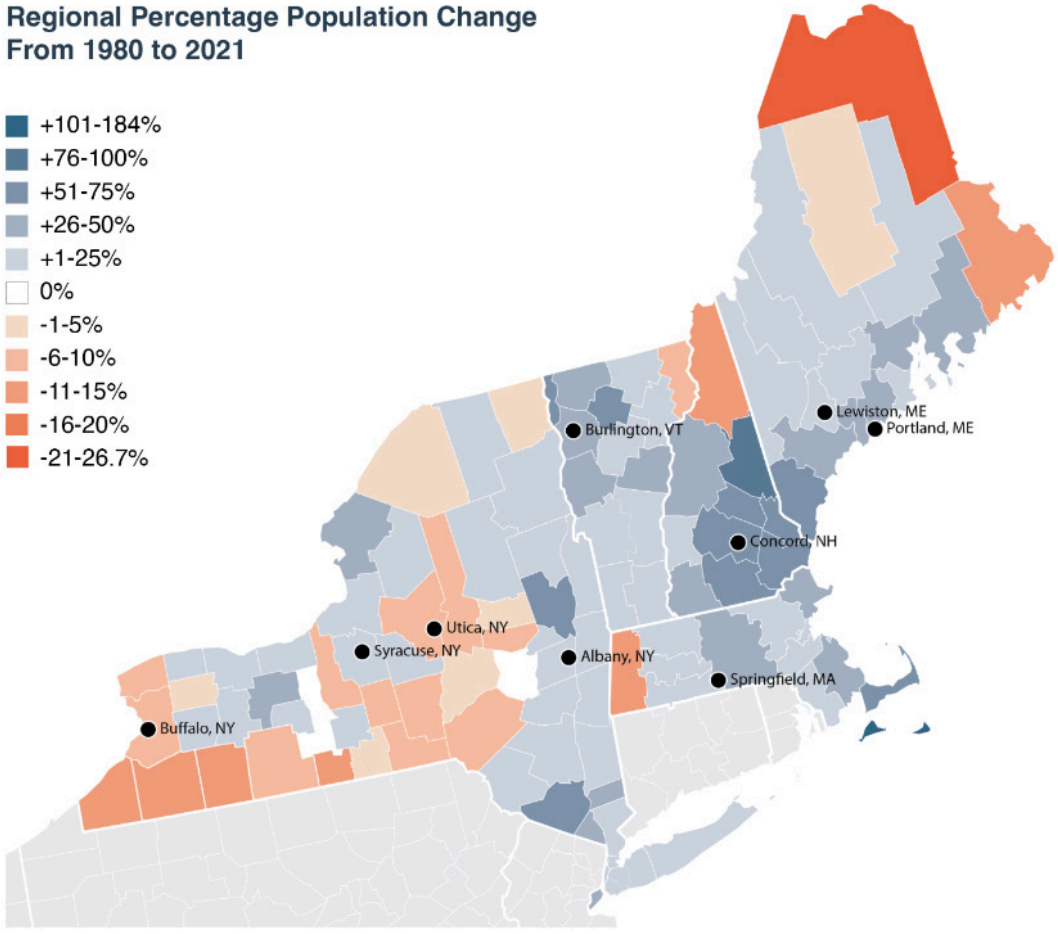

Figure 5. US Census data indicates that all coastal counties in the study region except Washington County in Maine, gained population in the last 40 years. In contrast, many rural counties, particularly in the Rust belt Region of New York saw overall population decline.

Graphic by Authors. Data Source: Population by year, county, race, & more. (2023, October 18). USAFacts. https://usafacts.org/data/topics/people-society/population-and-demographics/our-changing-population/

National Risk Index) and media narratives painting the Northeast as a "climate refuge," the Northeast faces its own climate challenges.. This is not to say that the Northeast will be free of its own climate challenges. The region is projected to experience one of the largest temperature increases in the contiguous U.S., rising by 3.6°F by 2035 from pre-industrial times even under moderate climate scenarios (Tebaldi et al., 2021; Almazroui et al., 2021). Already, New York State has experienced a 2 or 2.5°F increase since the beginning of the 20th century (Frankson et al., 2022), while Maine and Massachusetts are experiencing closer to 3.5°F of warming in that same timeframe (Runkle et al., 2022). Across the northeast, winters are warming faster than any other season. For example, since 1970 New Hampshire's winter minimum temperatures have increased 5.9°F while annual minimum temperatures have increased 3.1°F (Lemcke-Stampone, 2022).

Aside from temperature variation, coastal communities and riverside communities in the Northeast will be vulnerable to flooding due to increased inland rainfall, sea-level rise, and seiche (around the Great Lakes). Already, New York's coastline has seen almost 13 inches of sea level rise with another 1 to 4 feet projected by 2100 (Frankson et al., 2022). Seiche along Lake Erie and Lake Ontario are causing flooding and intense coastal erosion (Widrig & Vorenkamp, 2021). The Gulf of Maine is experiencing warming temperatures faster than 99% of the global oceans and surface temperatures have increased almost 2°F since 1970 (Rose et al., 2020). Sea level rise will continue to forcibly displace communities along the shore and it will also increase the frequency of "nuisance" flooding and the severity of nor'easters and hurricanes along the coast. Nuisance flooding in Portland, ME over the past decade occurred four times as often than the 100 year average. A 1-foot increase in sea level would increase the likelihood of a "100 year" storm flood level to once in every ten years (Rose et al., 2020). In New Hampshire, SLR could be anywhere from two to five feet by 2100 and despite having only 13 miles of coastline, communities have already begun to prepare (Wake et al., 2019; EPA, 2023). In the town of Seabrook, NH, if the ocean rises three feet by 2050, $110 million dollars worth of assets will be at risk during 100-year flood events (EPA, 2023). Even inland communities that are not at-risk for SLR flooding, are projected to experience more frequent and severe riverine flooding. Most recently, Vermont as well as New York's mid-Hudson Valley experienced severe flooding that was the result of a week-long precipitation total that was 300 to 600 percent above average (Jones, 2023). The same climate changes that act as pull factors into the region can very quickly turn deadly if the Northeast does not properly prepare for climate migration into the region while simultaneously reducing the climate risk of current populations.

In keeping with national trends, coastal counties deemed most at-risk for climate impacts related to SLR, are also the ones that have gained population in the last 40 years. According to NOAA's Office for Coastal Management, coastal counties across the Northeast are also home to the majority of the state population for all states except New Hampshire, with New York having the largest portion of its population living in coastal areas at 81%, followed by Massachusetts with 75%, then Maine with 55%, and finally New Hampshire with 36%. This means that Northeast will simultaneously need to consider the retreat of current populations from climate vulnerable areas while also planning for climate in-migration from other US regions.

While many communities will explore a variety of adaptation options to "buy time", for some the wide scale pullback of entire communities

through voluntary managed retreat programs and FEMA (and other) buy-outs will likely be the only option over multi-decadal time-scales. Currently over 200 homeowners across Vermont impacted by the severe flooding in July are considering a property buy-out (Elder-Connors, 2023). Importantly however, even when households participate in a buyout program they often relocate relatively short distances. A nationwide survey of households that participated in FEMA buyouts from 1990 to 2017 indicates that 74% of participating homeowners relocate within a 20 mile drive of their original home (Elliot and Wang, 2023). This result indicates that the Northeast should anticipate internal population shifts or churning, where some communities gain population at the expense of neighboring ones. This churning can have profound impacts on demographic distribution and racial composition of buy-out origin and destination communities, due to the way in which race influences housing location choice. The same nationwide study found that "96% of retreats starting in a majority-White tract end in a majority-White tract" which almost double "the racial correspondence for moves originating in majority-Black or majority-Hispanic tracts." This finding implies that inland majority-white locations within 20 miles of buy-out properties are likely to remain majority-white and possibly increase the proportion of whites to other races, which would only add to segregated racial composition at the county level. This means that considering the demographic impacts of climate in-migrants groups will need to be weighed in tandem with the disbursement of racial groups by managed retreat policies and buy-outs impact demographics across the Northeast.

Conclusion

As the Northeastern winters become more mild and southern summers become more unbearable, for many the climate of the Northeast may become more attractive to live year round. Climate in-migration could restore much needed economic vitality to communities that have faced population decline for decades, transforming the Northeast into a resilient, revitalized, and decarbonized region. Yet the Northeast will be forced to cope with climate change impacts on current populations including preparing for their potential relocation, while simultaneously planning to host new ones. Today, the region's spatial, socio-economic, and environment conditions reflect development paradigms that systematically have widened inequality among communities (Corvus & Sylvia, 2021). This history, as well as emerging social science research, suggests that, absent systemic change, climate migration will further marginalize already disadvantaged groups (Anguelovski et al., 2016; Shi & Moser, 2021). The question is not whether this region can adapt to climate change, but rather how adaptation for existing populations and future in-migrants can help repair past and current inequities.

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History of Migration and Population Change in the Northeast

Migration is not a new phenomenon in the Northeast. The historic and contemporary movement, displacement, and (re)settlement of people in, out of, and across the region has contributed to shifts in population and demographics for centuries (Figure 6). Although the Northeast is an expansive and diverse region, there are similarities across migration histories and trends. Employment opportunities and environmental amenities are among key pull factors drawing newcomers to all five states during the last few centuries. Examining these historical contexts illuminates reactions, barriers, and opportunities that may arise if future climate migration impacts the Northeast region. The following discussion highlights how the migration of people has continuously altered the economic, social, political, cultural, and environmental landscapes of the Northeast. This history provides context for the current social, economic, and political conditions that will shape the region's ability to host new populations. In particular, the challenges that Northeastern communities have faced when absorbing new populations in the past can be used as a proxy for the difficulties that could arise when integrating climate movers with differing demographic backgrounds. Further, a historical analysis brings to light the region's internal commonalities and legitimizes a regional approach to climate migration planning and management.

Indigenous Settlements to European Colonization

The Northeast region of the United States has been settled for at least 13,000 years. Before the arrival of European settlers, the Northeast was home to many Indigenous peoples, including the Haudenosaunee, Mohican, and Wabenaki tribes, among others. These Indigenous nations were semi-nomadic and practiced seasonal migration. Their migration patterns were closely tied to subsistence activities, such as hunting, fishing, and farming. For example, the Wabenaki moved between coastal (summertime) and inland (wintertime) settlements depending on the time of year (Harper & Ranco, 2009). Migration allowed for dietary diversity and seasonal resource gathering. Additionally, it allowed for adaptability to ecological and climatological events, such as low harvest or hunting yields and heavy flooding or snowfall events that have been characteristics of the region's environmental conditions for centuries.

With the arrival of European colonizers in the 17th century, the lives of Indigenous people were dramatically impacted. The establishment of trading posts for the exchange of fur and other goods introduced new forms of economic and political relations. Traditional subsistence-based migratory patterns were disrupted by the encroachment of European settlements. Settler expansion and colonization contributed to a rise in conflicts and violence and led to the spread of disease as well as the displacement, and cultural disruption of the region's Indigenous

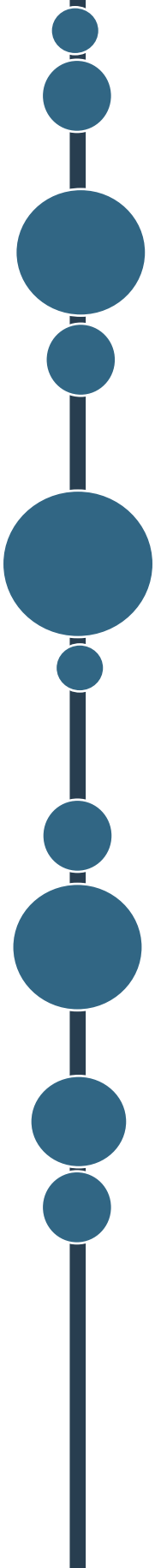
peoples. Further, the seasonal migration of Indigenous tribes and their communal land relations were both used as justification by Europeans to contest the validity of tribal land tenure. This argument undergirded the dispossession and removal of tribes from their ancestral lands (Bhandar, 2018).

In recent years, increased Indigenous activism has taken aim at reclaiming traditional homelands and protecting cultural practices. This has coincided with a resurgence of traditional ecological knowledge, including recognizing the benefits and biomimicry of migratory patterns. For example, Ithaca, New York, which is located on the ancestral homelands of the Cayuga Nation, is located at the confluence of multiple tributaries that flow into the southern end of Cayuga Lake. This location makes the city and surrounding area highly susceptible to annual flooding. Archaeological findings conclude that the area was likely used as hunting grounds and not for permanent settlement by the Cayuga people due to its risk of flooding (Jordan, 2022). Many communities across the Northeast have grown into areas that have high climate risk and are reliant on protection from built infrastructure and environmental regulations. Historic data on Indigenous migration and settlement patterns–or lack thereof–can provide insight into areas within the Northeast that may be more susceptibleto natural hazards and the impacts of climate change.

Industrialization, Labor Migration, and The "Great Migration"

The beginning of large-scale in-migration to the Northeast region started in

Figure 6: Timeline of Migration Events



1600-1800s
Indigenous Displacement

1600-1700s
Colonial Settlement and Expansion

1820-1870
Irish and German Immigration

1870-1900s
Industrialization

The Great Migration of Canadians and French Catholic Quebecois

1910-1970
African American Great Migration

Mid-1900s
Puerto Rican Migration

1970-1980
Southeast Asian Refugee Resettlement

1980s
Deindustrialization

2000- Present
Refugee Resettlement

2020-2022
Global Coronavirus Pandemic

Figure 6. Timeline of movement, displacement, and (re)settlement events contributing to shifts in population and demographics within the NEST region. Graphic by authors.

the late 18th century. The removal of Indigenous people opened large swaths of land to European settlers. They were drawn to the abundance of land, rich soil, timber, water, and other natural resources. The region's swift settlement contributed to the growth of economies of agriculture, fishing, and maritime trade. The fledgling nation of the United State was still reliant on Great Britain for many goods, including processed cotton and woolen cloth, whose production was mechanized through machine manufacturing. As the trade relationship between the United States and Great Britain grew more contentious, industrial development boomed in the Northeast and the demand for labor rose.

Beginning in the early 19th century, water-powered mills spread across the region, especially in coastal and riverine places in Maine, Massachusetts, New Hampshire, and Vermont. These small mills could employ up to seventy people who earned wages in the form of housing or company credit (Corbett et al., 2014). The influx of laborers contributed to the growth of mill towns that supported workforces with local services as well as spaces for commercial, social, and religious needs. The rise of mill towns transformed a predominantly rural, agrarian region into a network of semi-urban industrial economies. Textiles were the primary product of the American Industrial Revolution, but additional industries became mechanized as well, including food and specialty goods. By mid-century, there were nearly 900 textile mills across the Northeast and hundreds more devoted to other industrial production (Corbett et al., 2014). While the boom of milltowns supported local economies, the construction of dams to divert water and supply energy to mills had negative impacts on the region's ecological health. The diversion of water most acutely impacted the region's Indigenous people, who relied upon rivers for transport and seasonal fish migration as an important food source (Bennett, 2019).

While Indigenous people sought more robust fish populations, new industrial workforces found home in emerging milltowns. Initially, these low-skilled, low-wage positions were largely filled by poor men and women–and even children–who could not afford to own land. However, the locally-born population was not large enough to meet the labor demand. By the mid-19th century, many mills and factories were operated by immigrants from Western Europe, mainly Germany and Ireland, who were escaping political turmoil, religious persecution, and dire economic conditions. The first immigrants were largely Protestant, but subsequent waves were composed of Roman Catholics. This contributed to rising anti-Catholic sentiments manifesting in housing and labor discrimination that attempted to isolate Catholic immigrants from Protestant society. Resistance to this discrimination in the form of counter-protests and strikes led to cultural clashes that peaked mid-century. In the industrial towns of Bath, Ellsworth, and Portland, Maine, there were recorded instances of mob violence against Irish Catholic priests and residents that heightened tensions (Klein, 2017). While anti-Catholic sentiments continued well into the 20th century, German and Irish immigrants eventually found their footing in the wake of increased immigration from Asia, Eastern Europe, and Latin America, which shifted prejudice towards newly-arrived immigrant groups.

Despite the religious discrimination against Catholic immigrants, their assimilation eventually attracted others to the region. Catholic French Canadians, who were escaping the poverty of rural Quebec, followed in the footsteps of Irish Catholics and began arriving in droves to the Upper Northeast. It is estimated that by the mid-19th century, one in three people in Quebec had immigrated to the Northeast, replacing the Irish as the dominant workforce in mills (M. P. Richard, 2009). As religious and linguistic minorities in the region, Catholic French Canadians experienced

anti-immigrant discrimination, including from the local Irish populations who viewed them as labor threats. The arriving French Canadians established ethnic enclaves known as "Little Canadas" in mill towns that were perceived as resistant to assimilation. The state of Maine established "English only" laws to encourage assimilation by preventing locals from speaking French in public, including in schools and workplaces. These laws were not repealed until the 1960s (Gosnell, 2012). Today, over 30 percent of Maine's population is of French Canadian descent, and New Hampshire and Vermont follow closely with roughly 20 percent (Vermette, 2018).

The proliferation of millwork and other industries increased the demand for more efficient freight and trade routes. The Erie Canal and railroad system, both built with immigrant labor, helped to extend industrial connectivity throughout the Northeast, especially into Upstate New York. These transportation corridors established new markets for heavy industry and large-scale manufacturing along their routes, among them the cities of Syracuse, Rochester, and Buffalo. Due to the increase in immigration and proximity to New York City, the region had an ample supply of labor. By the end of the 19th century, the state of New York had grown over tenfold and was home to almost 11 million people (United States Census Bureau, 2021a). Largely due to the outsized presence and political mobilization of immigrant communities, New York City and Upstate New York were relatively more tolerant than rural communities in other Upper Northeast states. This contributed to a rise in religious revivalism, radical politics, and environmentalism across Upstate New York in the latter part of the century.

At the turn of the 20th century, the Northeast was a fully industrialized region booming with employment opportunities in expanding sectors. The favorable economic conditions of the Northeast combined with deteriorating economic and social conditions of the segregated South motivated one of the largest population shifts in U.S. history, known as the Great Migration. Beginning in the 1910s and extending through the 1970s, more than 6 million Black Southerners moved out of the region to settle in other parts of the country (Eichenlaub et al., 2010). The majority of movers resettled in large urban areas where employment opportunities were concentrated, like Boston and New York City, but others continued further to settle in smaller industrial cities, like Buffalo and Rochester (Andrews & Wainer, 2017; Tolnay, 2003). The advent of WWII increased the demand for industrial production while slowing the flow of immigrants from Europe. Employers hurried to replace the labor force, accelerating the arrival of Black migrants to the Northeast.

Economic and educational opportunities were a key motivator for many who moved during the Great Migration. However, like newcomers to the region before, their integration was spurned by locals. Wage differences across the Northeast enabled employers to pay Black laborers the lowest wages (Marks, 1985). Even though jobs were abundant, the labor market that Southern migrants entered was already heavily ethnically and racially stratified, which stymied economic advancement and fueled tensions. While many early movers from the South were more educated and had higher literacy rates than the local Black population in the Northeast, the majority of migrants found themselves in low-skilled industrial professions characterized by poor working conditions (Marks, 1985). Opportunities available to Black laborers were concentrated in the lowest economic tiers, which contributed to increased competition and division between Black Southern migrants and Black Northerners (Tolnay, 2003).

Figure 7: Regional Change in Population by Race 2011-2021 by millions excluding population count for NYC and Boston

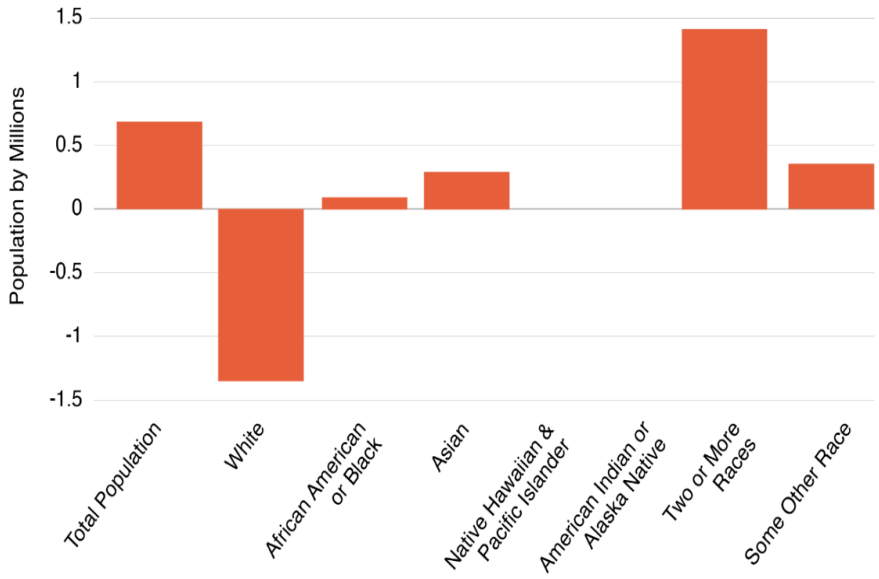


Figure 7. The population of two or more races saw the largest gains in the 2011 to 2021 period whereas the white population saw the largest losses. Importantly, all minorities saw average population gains, indicating increasing racial diversity in the region. Graphic by Authors.

Data Source: U.S. Census Bureau (n.d). *ACS Demographic and Housing 1 Year Estimates DP05.* U.S. Department of Commerce. Retrieved Septmber 2, 2023, from https://data.census.gov/

Figure 8: Components of Regional Population Change 2000-2020 Excluding Population Count for NYC and Boston

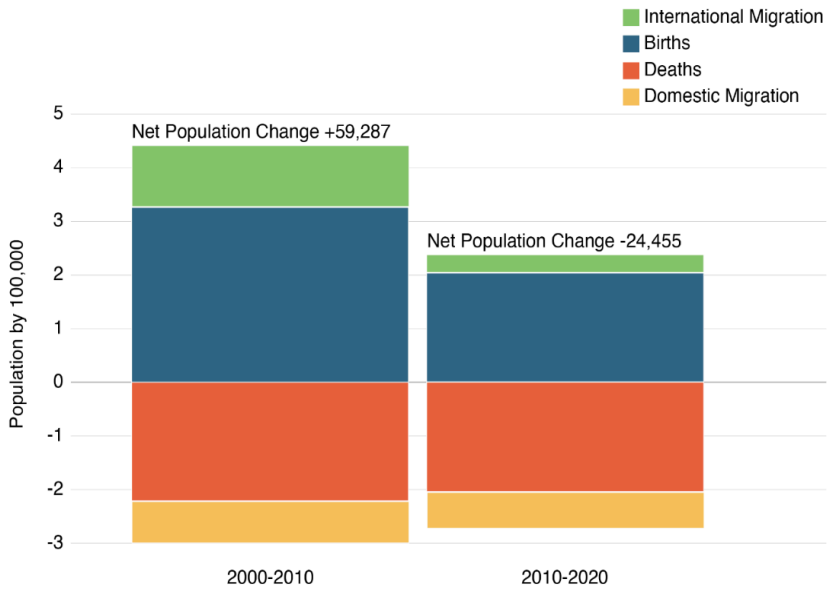


Figure 8. In the 2000 to 2020 period, international in-migration and births were the two key components of population growth, whereas domestic out-migration were the two key components of population decline. The Northeast saw overall population gains in the first decade of the century and overall population decline in the second decade.

Graphics By Authors.

Data Source: U.S. Census Bureau. (n.d.). *County Population Totals 2000-2010.* U.S. Department of Commerce.

U.S. Census Bureau. (n.d.). *County Population Totals 2010-2020.* U.S. Department of Commerce.

Beyond economic competition, housing was limited due to the spatial segregation of Northeastern cities. Many Black migrants settled into existing segregated districts, sometimes called “Black Belts.” As more migrants arrived, Black residents began to spread into nearby white working-class neighborhoods leading to additional conflict and violence (Blatto, 2018). Competition, growing tensions, and perceived threats induced “white flight,” in which white families moved from inner cities to surrounding suburbs. This had rippling economic and political impacts resulting from a shrinking population and reduced tax base (Eichenlaub et al., 2010; Tolnay, 2003). Even though the labor provided by Black migrants was crucial to the mid-century economy of the Northeast, existing race relations and segregation challenged the ability of receiving communities to integrate newcomers.

Domestic Out-Migration and Decline

In the 1950s, the decline of manufacturing and industrial production, which had sustained the region for nearly a century, spawned a hollowing out of urban cores and mill towns. The loss of jobs led to an exodus of residents, including immigrants and Black migrants who relocated or returned to other regions of the U.S. (Hunt et al., 2008). From 1950 to 2000, the Northeast experienced a net population decline of 6.1 percent (Rappaport, 2003). In the span of roughly 50 years, Buffalo and its metropolitan region lost over half its peak population and had a -12.8 percent growth rate (Blatto, 2018; Rappaport, 2003). Rochester, Syracuse, and Portland, among other industrial towns, suffered similar extreme population losses.

While population decline and an aging workforce continue to inhibit some Northeastern communities from recovering from deindustrialization, there are signs that the geography and infrastructural capacity of the region could facilitate a demographic and economic resurgence. In 2005, Agro-Farma, which makes yogurt under the Chobani brand name and was founded by a Turkish immigrant, established their headquarters in the small New York town of Norwich with production facilities in nearby South Edmeston. The location was selected due to its close proximity to dairy production and central location to transportation hubs (Neuman, 2012). As the company has grown, it has created a boon for the local economy and regional agricultural sector. In 2022, microchip company Micron announced an intended move to the Syracuse area from the west coast. The abundant access to water is a key factor in the move as it is necessary for data storage cooling systems and is an increasingly precarious commodity in the Western U.S. (Tampone, 2022). Micron’s relocation is anticipated to create close to 50,000 jobs for the planning, construction, and operation of chip plants which real estate experts estimate could draw between 200,000 to 400,000 people to the Syracuse area (McCarthy, 2022). This suggests that climate-induced corporate relocation in the future could reverse trends and once again restore flows of labor mover into the region.

International Immigration and Refugee Resettlement

In 2020, Maine, New Hampshire, and Vermont were the three states with the least racial and ethnic diversity in the country (United States Census Bureau, 2021). However, a rise over the last two decades of international immigration to the Northeast has actually increased the region’s diversity. As shown in Figure 7, the proportion of people identifying as a race other than white has increased in the last decade. This occurred

through the simultaneous out-migration of white population and in-migration of international immigrants, depicted in Figure 8.

One of the key channels for international immigration has been refugee resettlement. Since the early 2000s, U.S. refugee resettlement agencies have preferred to place refugees in smaller cities and towns as opposed to larger, historic gateway cities, like New York City or Chicago (Bose, 2018). The Northeast has been considered a desirable region for refugee resettlement due to its many legacy cities with high industrial capacity, more affordable housing, and shrinking populations. Since 2013, 44,228 refugees have made their home in the Northeast (Immigration Research Initiative, 2023). Across the Northeast, policymakers, advocates, and community members have championed the many benefits that resettled refugees bring to small communities, including population growth, economic entrepreneurialism, and cultural vibrancy.

Utica, New York is one of the most well-studied examples of the benefits of refugee resettlement at the community level. While other cities across the U.S. have experienced success integrating refugee populations, Richard and Callahan (2020) argue that the visibility and outsized impact of refugees' contributions in Utica make the city a unique case study. Refugees are credited with saving the community from decline and abandonment at the turn of the 21st century through their participation in local labor and real estate markets (Hagstrom, 2000). In contrast to wealthier amenity movers, refugees have boosted the local economy by taking low-wage jobs, opening small businesses such as restaurants and grocery stores, and revitalizing neighborhoods by purchasing vacant properties (Singer & Wilson, 2006).

Public sector service provision has been central to the integration process and supported by strong nonprofit leadership that has paved the way for a whole-of-society approach. Founded in 1975 during the first arrival of Vietnamese refugees, the Mohawk Valley Resource Center (MVRCR) has been the leading refugee services organization in the community. They offer direct services to refugee families, including English language classes, legal assistance, workforce development resources, and cultural education. In addition, MVRCR supports refugee integration through no-cost community education and training to schools, hospitals, employers, and public officials (Singer & Wilson, 2006). In the words of a former MVRCR Executive Director, Utica has earned a national reputation of "tolerance, diversity, and good will" by welcoming and embracing new arrivals to the city (Scott, 2016).

The successful integration of refugees in the region has paved the way for welcoming more international immigrants. Lewiston, Maine is one community that has benefited from ongoing in-migration after initial refugee resettlement. In 2000, the Somali diaspora in Maine was growing after resettlement agencies placed new arrivals in Portland. Due to lower costs-of-living and affordable housing availability, some of these families moved to nearby Lewiston. By 2002, the Somali population in Lewiston reached 1,000, a sizable presence for the city of 36,000 residents (Belluck, 2002). The population boom was sustained by flows of refugees who had initially been resettled in Atlanta, Georgia. According to survey results, 35 percent of Somali movers to Lewiston indicated that community and kinship ties were the primary reason for relocation, as well as employment opportunities and housing availability (Forrest & Brown, 2014). The community has attributed the economic revitalization and stabilization of the local housing market to Somali refugees, who transformed the former mill town into a diverse melting pot.

Although Lewiston and Utica stand out as examples of successful integration, the arrival of diverse movers also poses economic, political, and social challenges to communities across the Northeast. In fact, even Lewiston had to address tensions and challenges that initially rose in the early 2000s in response to the first Somali refugee arrivals. The New York Times reported that when the first Somalis arrived, false rumors spread that they were receiving free cars and groceries, prompting backlash from local residents. Furthering this narrative, Lewiston's mayor wrote a public letter to the Somali community asking them to tell their friends and family to stop coming, arguing the city was "maxed out financially, physically, and emotionally" (Belluck, 2002). The mayor's letter speaks to the challenges of small towns in the Northeast to integrate new populations. Many have long histories of racial and ethnic homogeneity and lack the resources and capacity necessary to meet the needs of culturally, linguistically, and religiously diverse groups (Bose, 2018). For example, over 550 asylum seekers arrived in Portland, Maine in the first two months of 2023, overwhelming agencies who struggled to meet their housing needs. By late February, Portland Mayor Kate Snyder stated that the city was "...at a cliff, and we don't have everything we need to respond to the needs of the community" (Ohm, 2023). Beyond housing access and affordability, some of the key challenges that refugee communities face in small towns or cities include health care access, employment opportunities, and feelings of isolation due to small or non-existent social networks (Bose, 2018).

The arrival of diverse groups in traditionally homogenous communities in the Northeast has led to xenophobic and racist responses. In March 2023, the Anti Defamation League published a report indicating that white supremacist activity rose by 96 percent from 2021 to 2022 across New England (Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont) (Russell & Terhune, 2023). In Lewiston, an external neo-nazi hate group traveled to the community emboldened by the mayor's letter in response to the rapid growth of the city's Somali population (Rabrenovic, 2007). In other instances, anti-immigrant groups developed within a community in response to resettlement. In 2016 in Rutland, Vermont, a local group spread fear-mongering and xenophobic messaging in an attempt to deter the mayor's decision to welcome Syrian refugees (Bose, 2018). Fortunately, both Lewiston and Rutland were able to respond to and recover from these actions, but they remain examples of negative community responses to the in-migration of diverse groups and confirm the need for participatory and proactive strategies to combat racism and xenophobia and promote acceptance and inclusion.

Amenity Migration and the COVID-19 Pandemic

In addition to seeking employment and the opportunity to start a new life, populations have also been drawn to the natural beauty and diverse topography of the Northeast since before the arrival of European settlers. In the late 19th century, the region's industrialization inspired backlash and gave rise to a conservation movement aimed at preserving the region's natural assets. The proximity of recreation sites to major cities has contributed to a history of amenity migration and second-home ownership which has supported local economies of art, culture, and tourism. However, amenity migration to the Northeast is largely characterized by affluent, educated, and older movers, which presents challenges for local housing markets, municipal taxation, and cultural integration.

At the peak of the region's deindustrialization in the 1970s, there was a rural renaissance as the "back to the land" movement took hold. For the first time in 150 years, the rural U.S. grew at a faster rate than cities or suburbs (Treadwell, 1990). Rural towns across the Northeast experienced sudden population booms as young urbanites and older retirees relocated to rural settings, attracted by the alternative lifestyle, natural amenities, and low cost of living (Mockrin et al., 2013). While this rapid onset provided a short-lived economic boost, many local residents were unsettled by the swift changes brought by newcomers. In rural Maine, many people lived in poverty and sustained themselves through seasonal work after mills and manufacturing sites collapsed. In-migrants, who were generally wealthier and more educated, represented not only a threat to their economic livelihoods, but also their way of life. There was a popular bumper sticker at the time that summed up these feelings: "KPOOM," which stood for "Keep People Out of Maine" (Weil, 2022). Ultimately, the population surge reversed and by the late '80s many migrants had moved out of rural areas due to low economic opportunities and quality of life, representing another blow to rural communities (Treadwell, 1990).

One of the most persistent challenges for Northeastern resort towns and rural communities is housing. In recent years, the limited supply and high demand has driven up housing and rental costs leading to increased real estate speculation and the displacement of local residents (Laitos & Ruckriegle, 2013). A 2019 study named Maine the top state for seasonal and vacation homes with an estimated 19 percent of its housing stock vacant for the majority of the year; Vermont and New Hampshire were close behind with 17 and 12 percent, respectively (IPX1031, 2019). In Bar Harbor, ME, a coastal resort town located next to Acadia National Park, over one in five homes is for seasonal use. The demand and competition has priced out low- to moderate-income residents, especially those in service-based and hospitality industries that are critical to the town's economy. While tourism is a key economic driver, property taxes compose over 84 percent of the town's budget, creating a financial dependency on increased property valuation (RKG Associates, 2022). This reality, which is also true for other rural resort and ski towns across the Northeast, furthered existing inequalities in homeownership.

The COVID-19 pandemic spurred a wave of amenity migration across the Northeast. In March 2020, as the pandemic wreaked havoc on New York City and other Northeastern cities, people began to move to less populated areas. Counties in Upstate New York, which had long experienced out-migration, had population gains as city dwellers moved in (Dean, 2022). Nearly every county in Maine, New Hampshire, and Vermont had similar population gains as out-migration slowed and in-migration rapidly increased especially in high recreation and retirement areas (Johnson, 2023). As with previous amenity migration, these in-migrants tended to be more affluent and more educated than existing residents, enabled in part by the ability for the professional class to work remotely with broadband access (Weil, 2022). For instance, the average income of households that moved into Hancock County, Maine in 2020 was 20% higher than that of current residents (Bouvier, 2022). Overall pandemic amenity movers tended to be younger, with 43 to 45 year-olds as the largest age group; As a result, Maine experienced a decrease in its statewide median age in 2021 (Piper, 2021; Weil, 2022).

The impact of younger movers is evidenced by the challenges of the Portland suburb of Cumberland, Maine. During the pandemic, the town's population grew by 6 percent in a single year, 3 times faster than the last decade. In

response, home prices shot up by over $150,000 and were sold on average 10 times faster due to demand (Van Allen, 2023). The influx of younger families has overwhelmed local schools and led to plans for a new school that can serve up to 700 more children (Valigra, 2022). The town of Cumberland has worked to accommodate this growth by encouraging density and mixed used development through zoning restrictions that attempt to preserve its small town character and natural amenities (Valigra, 2022). The demand for housing, however, is outpacing new home construction in Cumberland and elsewhere in the state, largely due to seasonal homes and short-term rentals. This is leading municipalities to take more creative strategies to meet the demand, including residency requirements and creating housing funds from the sale of foreclosed properties (Genter, 2023).

However, not all areas experienced in-migration growth during the pandemic. Counties along the Rust Belt of Upstate New York and the Adirondack region had net population losses, notably in the suburban areas outside Buffalo, Rochester, and Syracuse (Rogers et al., 2023). While the data follow historic trends of out-migration, these urban counties also recorded more deaths than births, which signal an aging local population (Johnson, 2023). For these regions, population retention and in-migration, especially of younger movers, may be a lifeline for their economic survival. Increasingly, cities are adopting economic development strategies that attempt to attract certain movers through advertising local amenities or making big investments in select industries. While these may provide short-term growth, this approach draws resources away from existing residents that deepen inequities and create social barriers for the integration of newcomers.

The pandemic had acute impacts on migration patterns across the Northeast, but the long-term effects remain to be seen. As a whole, the Northeast continues to grow, yet many rural areas that gained domestic migrants have since slowed or reversed population gains entirely (Rogers et al., 2023). Still, the data show a slowing of post-pandemic domestic out-migration, which may be a good sign for the region at large in terms of recovering its tax base and economic activity. Amenity in-migration, however, continues to pose a problem for places across the Northeast. Integrated regional solutions that leverage land use planning to increase affordable housing and support community integration are strategies that will benefit the region while protecting its natural beauty for decades to come. If the region were to become a climate destination, critical investments in physical and social infrastructure as well as land use tools like rolling easements and long-term resettlement will need to be central to growth management strategies.

Conclusion

Migration events and historical population change in the Northeast reveal the opportunities and disparities associated with human mobility. Movement to and within the region has had profound impacts on economic opportunity and vitality with the region owing much of its industrial era growth to laborers who relocated from other parts of the country and around the world. At the same time, migration has contributed to increased inequities that have primarily manifested along class, racial, and ethnic divides. Across migration events, access to housing has been a key issue disproportionately affecting marginalized groups. New arrivals to the region were often forced into either low quality or poorly situated housing that limited access to labor opportunities, resources, or social integration. In other cases, local residents were displaced by increased housing costs

due to new arrivals. Additionally, newcomers faced racial and ethnic discrimination across Northeastern communities, particularly when their demographic background differed from that of the host population and even when their in-migration had visible benefits for the whole of society. Any future in-migration will likely add to the region's diversity. Acknowledging and remediating challenges faced by communities during past in-migration events is essential in preparing for climate migration.

The history of migration and population changes discussed in this section should be viewed in context. While past migration events can serve as helpful guides for communities to understand their history, how it impacts their present, and to anticipate potential issues related to in- or out-migration, these events are not proxies for the future. The reality of projected climate-related migration remains to be seen on a larger scale. As communities prepare for the impacts of climate change and the potential of new migration trends, they should gauge how climate independently affects different demographics and develop new strategies that proactively address housing issues, social cohesion, and economic vibrancy.

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Synthesis of Regional Workshops

The NEST project sought to determine what challenges and opportunities might exist for communities that could face climate-related in or out migration by conducting stakeholder listening sessions across the regions in this study. Four events took place in the spring of 2023 that targeted specific communities in the Northeast: (1) the Vermont and New Hampshire Upper Connecticut River Valley; (2) Coastal Maine and New Hampshire; and Upstate New York's Rust Belt communities in (3) Buffalo and (4) Rochester, Binghamton, Syracuse, Albany, Ithaca, and the Hudson Valley. The regional approach allowed for close examination of cross-cutting similarities and differences between places regardless of jurisdictional boundaries, revealing trends in community challenges and opportunities, migration flows, and climate stressors. Aside from collecting important information about the current and future challenges and opportunities facing the region, stakeholder workshops intended to lay the groundwork for network building and information sharing about climate preparedness and accommodating new populations.

Despite differing historical migration flows and variance in current demographics, key takeaways from each of the regional stakeholder engagement events yielded the important consensus that current social and economic challenges constrain the quality of life for communities in Northeast and are only expected to worsen in the face of any future in or out climate migration. Participants at each of the four events identified a host of sectoral and governance issues that are integral to community preparedness, regardless of climate migration. These sectoral issues include housing, social services, economic development, education and workforce development, food security, social inclusion, and environmental health. Beyond these, participants in the Coastal Maine and New Hampshire, and Upper Connecticut River Valley groups identified climate change as a separate challenge that surfaces new issues and exacerbates the existing sectoral ones. Participants also identified five governance constraints, including governance structure, spatial distribution of inequity, local culture and politics, funding, and the availability of data and research. Although there are important place-based dynamics that shape how each of these challenges manifest in local contexts, the extent to which each of these three regions converge should be taken as strong evidence for the importance of regional collaboration, resource-sharing, and decision making.

Methodology

The NEST regional stakeholder engagement events took place in March and April 2023. Each region conducted stakeholder outreach through university-affiliate networks and partner networks, which are listed in Table 1. Significant efforts were made to invite and include diverse participants, especially from historically marginalized groups, including indigenous people. The extent to which this was effective varied across the region. The Coastal Maine and New Hampshire group was held during the annual convening of the New Hampshire Coastal Adaptation Workgroup (CAW) and the Maine Climate Change Adaptation Providers Network (CCAP) in South Portland,

Maine, and thus included stakeholders affiliated with both, plus other members of the public. The Upper Valley event was held in Lebanon, New Hampshire and was convened by the NEST research team at Antioch University. This was one of a 4-part series by the Connecticut River Joint Commission. In New York, the Buffalo workshop partnered with Partnership for the Public Good to identify relevant stakeholders and host the workshops, and the Rust Belt workshop in Ithaca was organized by the NEST research team at Cornell University.

Although each of the regional stakeholder engagement events varied slightly in their agenda and structure, each included a World Cafe, in which stakeholders participated in small group scenario-based discussions. This exercise sets up multiple tables with different prompts at each. Participants circulate among tables over multiple rounds to engage in diverse issues. Participants were randomly grouped at tables for each scenario, each with a facilitator and note taker. Facilitators asked participants to consider what each scenario would look like in their community, and what actions and choices would result in that scenario actually happening. The Coastal ME/NH and Upper Valley regional groups oriented their discussions around two scenarios based on whether the community was experiencing in or out-migration, and did not provide any more details aside from one considering population gain and the other considering population loss. The Rust Belt events had participants consider 4 scenarios based on two variables, whether migrants come or leave

Table 1: Characteristics of Regional Stakeholder Engagement Event Attendance

	Coastal ME & NH	Upper Valley VT & NH	Rustbelt NY
Attendees	75	50	Buffalo - 40 Ithaca - 37
Network Affiliations	• New Hampshire Coastal Adaptation Workgroup (CAW) • Maine Climate Change Adaptation Providers Network (CCAP) • University of Southern Maine • University of Maine • University of New Hampshire • Gulf of Maine Research Institute	• Connecticut River Joint Commission • Upper Valley Climate Adaptation Workgroup • Dartmouth University • University of New Hampshire • Antioch University of New Hampshire	• Partnership for the Public Good • Cornell University
Represented sectors and interest groups	• Community planners • Housing organizations • Real estate • Land conservation organizations • Immigrant services organizations • Transportation and infrastructure • Climate adaptation professionals • Youth	• Community planners • Housing organizations • Land conservation organizations • Local and state government professionals • Nonprofits + community groups • Academia • BIPOC organizations • Local business	• Community planners • Public officials • Nonprofits + Community groups • Academia/Think tanks • Immigrant services organizations • Climate adaptation professionals

Table 1. Each regional stakeholder event relied on university affiliations and partner networks to invite diverse stakeholders. The last row in the table indicates which sectors were represente by stakeholders who were able to attend, although invitations and outreach were conducted beyond these sectors.

and whether a community is well prepared or not, conceptualized by the following graphic and scenario descriptions:

1. **The Responsive, Well-Adapted Community, Repair Past Ills** (upper left quadrant) In this scenario, the population is either stable or shrinking as people leave for climatic, economic, or other reasons. However, the community (city or town) is working together to adapt to climatic impacts while ensuring that remaining residents are able to flourish and live safe and healthy lives. The community takes steps to redress existing challenges stemming from historic inequities and unsustainable practices. If the community shrinks, it is able to do so in ways that retain a healthy environment and sense of spatial and social cohesion.

2. **The Proactive, Welcoming & Caring Community** (upper right quadrant) In this scenario, the population is growing (in pulses or in gradual increments) as climate impacts make the Northeast an increasingly attractive place to live and work. The community accommodates growth without displacing existing residents or significantly harming the local environment. Newcomers are welcomed into the community and wish to become part of the community without creating significant social divisions.

Figure 9: Municipal Climate Migration Scenarios

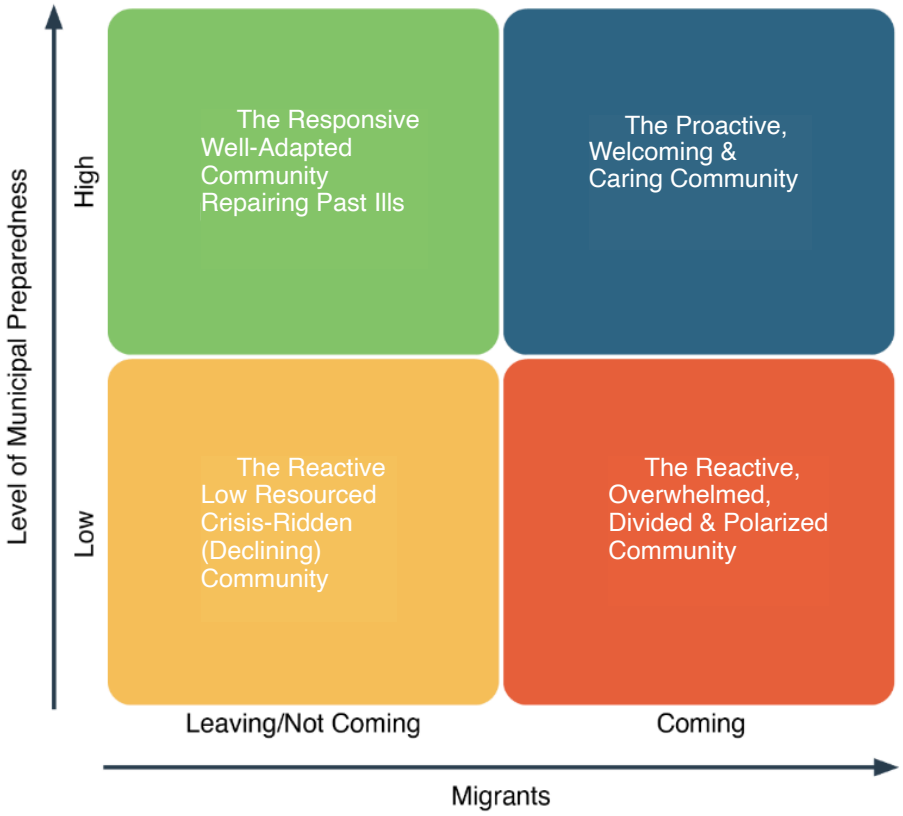

Figure 9. The quadrants represent 4 scenarios considered by stakeholders. The type of population change, whether residents are leaving and/or migrants aren't coming or migrants are coming, is depicted on the x-axis. The level of municipal preparedness is depicted on the y-axis.

Table 2: Regional Stakeholder Engagement Event Discussion Questions

	Coastal ME & NH	Upper Valley VT & NH	Rustbelt NY
Discussion Questions	1. Who is moving? 2. What challenges arise in this scenario? 3. What opportunities arise in this scenario? 4. What does a prepared community look like in this scenario? 5. What plans, policies and programs do we need to be more prepared?	1. Who is moving? 2. Who is impacted in this scenario? 3. What does a proactive, welcoming, caring, and resilient community look like in this scenario? 4. How can we have [in - or out-migration] that is equitable/sustainable for everybody?	1. Who is moving? 2. What does this scenario look like in your community, specifically? Who is impacted, and how? 3. What actions / conversations / processes result in this scenario?

Table 2: Summary of regional group discussion questions.

3. **The Reactive, Low-Resourced, Crisis-Ridden** (Declining) Community (lower left quadrant) In this scenario, the population is either stable or shrinking as people leave for climatic, economic, or other reasons. The aging community and infrastructure create increasing costs and a declining tax base from which to maintain infrastructure and services. The community lurches from one crisis to another, such as employer closures, pandemics, violence, and natural disasters. It cannot seem to get in front of these diverse disasters, resulting in poor community health and well-being outcomes.

4. **The Reactive, Overwhelmed, Divided & Polarized** (Growing) Community (lower right quadrant) In this scenario, the population is growing (in pulses or in gradual increments) as climate impacts make the Northeast an increasingly attractive place to live and work. This in-migration intensifies pressures on affordable housing, creating significant antagonism between existing residents and newcomers, which also tend to fall along class and race divisions. Population growth drives growing sprawl and demands on infrastructure that balloons costs and exacerbates new spatial inequality as those who can afford it live in safer, more resilient, and better resourced neighborhoods.

Results and Discussion

Stakeholders across the three regions were enthusiastic about the chance to talk about these issues and expressed gratitude to the NEST teams for creating the space to collaborate about climate migration preparedness. Yet, many also expressed real doubts about the capacity of local governments to both remedy existing challenges and harness the proposed benefits of future climate migration. The NEST teams received important feedback about the need for engaging different groups that were not represented during the events and noted concern that marginalized communities would be further left behind if their voices are not present in these discussions. Each regional group used a variation of similar questions to guide the conversation in each scenario, summarized in Table 2.

Participants had differing reactions to and assumptions about the scenarios framing the World Cafe discussions. During the Rust Belt events, which considered the level of community preparedness in each scenario, participants

Table 3: Motivations of In-Migration and Out-Migration

	Coastal ME & NH	Upper Valley VT & NH	Rustbelt NY
OUT-MIGRATION			
Economic	• Retirees • New homeowners • Students and young professionals • Young families • Service worker • Multi-generational families	• New home owners • Students and young professionals • Service workers • BIPOC communities • Single parents • Job seekers • Renters • Remote pandemic workers • Non-corporate farmers and natural resource industries	• Students and young professionals • BIPOC communities • Large corporate employers and their workforce • Small contractors • Non-corporate farmers and natural resource industries
Environmental	• Coastal homeowners • Natural resource industries	• Aging adults looking for warmer climates • Natural resource industries	• Natural resource industries
Amenities and Services	• People who need specialized services elsewhere (e.g. healthcare) • Pandemic coastal city movers	• People who need specialized services elsewhere (e.g. healthcare)	
Cultural			• Resettled refugees moving to more established diaspora
IN-MIGRATION			
Economic	• College graduates moving back to live with their parents • Resettled refugees and immigrant diaspora • Short-term, seasonal, and contract workers • Tech industry employers and workers • Middle class workers with flexible jobs • Students attending university	• College graduates moving back to live with their parents • Resettled refugees and immigrant diaspora • Short-term, seasonal, and contract workers • Entrepreneurs • Healthcare and education industry workers • Students attending university	• Resettled refugees and immigrant diaspora • Healthcare and education industry workers • Students attending university
Environmental	• Climate migrants • People with environmental health risks	• Climate migrants	
Amenities and Services	• Remote workers • Retirees • Wealthy first and second home buyers • Pandemic city movers	• Remote workers • Retirees • Wealthy first and second home buyers • Pandemic city movers	• Remote workers • Wealthy first and second home buyers
Cultural	• Young people and young families • Resettled refugees and immigrant diaspora • People looking for culture, art, and community	• Young people and young families	• Resettled refugees and immigrant diaspora

Table 3: Stakeholders at all three regional convenings identified motivations of current in and out-migrant groups. While specific demographics of movers are shaped by local conditions, 4 motivations for movement were common to all three regions including, economic, environmental, amenity and services, and cultural factors. Across all three regions, stakeholders identified the pandemic as a recent catalyst for in-migration of primarily, higher-income, younger, groups, moving away from cities and into more rural areas.

indicated that the "not prepared" scenarios most closely aligned with how communities are feeling now, rather than a hypothetical consideration for the future. When discussing what being "prepared" for migration would look like, it was understood that there is no perfect scenario but there was enthusiasm for the need to implement policies and services that would increase a community's capacity to take care of current populations and absorb newcomers. Importantly, it was noted that climate migrants that have agency in their relocation choice will choose to move to places that are already serving their demographic so in preparing for an influx of climate migrants, communities should be listening to existing populations' needs and concerns.

Stakeholders that participated in the Coastal Maine and New Hampshire session, articulated general optimism about the economic growth that climate migration could bring but reported the overall need to incorporate climate migration planning into state level policy, particularly in Maine. There was recognition that climate migration won't just be interstate, it will also be within the state itself, particularly driven by sea-level rise, and that coastal states will likely face in-migration and out-migration scenarios simultaneously as people move inland.

We analyzed stakeholder discussions from each scenario in each regional workshop to determine: (1) who is moving in and out in each region; (2) what key challenges currently face communities and could face communities under each scenario; (3) who is most impacted by those challenges; and (4) what key solutions/ opportunities exist to address those challenges or facilitate other change. Even though the Rust Belt World Cafes contemplated four scenarios while the Coastal ME/NH and Upper Valley events explored only two, similar challenges and solutions emerged across all three regions including both sectoral and governance challenges. Above all, participants across all three regions emphasized that **the quality of life and equity in the Northeast is currently constrained by the numerous challenges identified, which are only expected to worsen in the face of climate migration.**

How will climate-related migration affect local quality of life?

Participants across the region identified seven sectoral issues that are likely to be impacted by climate-related migration and that influence the extent to which the region can be a welcoming, inclusive, and adapted receiving community. These sectors include housing, social services, economic development, education and workforce development, food security, social inclusion, and environmental health.

Housing was identified as the number one equity challenge facing communities across the Northeast, which will only face further pressure in all climate migration scenarios. The most common housing issues pertained to affordability, accessibility, and quality.[1] While different market and regulatory pressures shape housing affordability issues across different states, participants indicated that low-income renters (comprised of BIPOC communities particularly in cities) have been hit hardest due to rising rent prices and reduced rental stock leading to

1These concerns are borne out by the data: COVID-19 exacerbated many existing housing issues across the region. In Maine, 39.3% of homeowners without a mortgage were cost burdened and 41.5% of renters are cost-burdened (Brennan, 2022). In Vermont, the median home price has increased more than 35% since 2019 (Weinberger, 2023) and 36% of all households in the state (renter and owner) are cost burdened (Vermont Housing Finance Agency, 2020). These trends are similarly reflected in New Hampshire, Vermont, and Massachusetts.

gentrification, due to the relative profitability of even shorter-term rentals operated by Airbnb. The affordable housing stock will continue to face pressure if climate migrants moving into the region are low-income groups, such as those displaced by disaster. Plus, wealthier climate migrants seeking second homes close to environmental amenities (particularly since the COVID-19 pandemic) have raised demand for real estate, reducing the availability of starter homes and home ownership rates among local residents. Participants across all three regions highlighted that it's not just about whether housing is available, it's also about whether it is safe, citing the rapidly deteriorating and aging housing stock across the entire Northeast. Both Upper Valley and Rust Belt participants anecdotally linked aging and poor quality housing to public health issues and climate vulnerability. Particularly in areas characterized by an aging population such as in the Rust Belt and coastal regions, housing quality has forced the relocation of older, health-compromised, and disabled folks as well as those who cannot afford the high cost of flood insurance.

The **accessibility of social and care services** was also frequently mentioned as an obstacle to adequately serving the Northeast's current population and viewed as an issue in

Table 4: Groups Affected by the Impact of Climate Migration on Each Sectoral Challenge

Sectoral Challenges	Impacted Groups
Housing	• Renters and low-income groups • Unhoused populations • Youth and young professionals who cannot afford to live on their own • BIPOC communities subject to systemically racist housing policies, redlining, and segregation, gentrification • Elderly whose housing is either unsafe or inaccessible
Economic Opportunity, Workforce Development, & Education	• Residents with skill sets tied to dying industries • College graduates from local universities who cannot find housing or desirable work • BIPOC communities • Residents previously employed by large businesses who have pulled out of the region • Youth located in areas of out-migration and a diminished taxbase that has forced school closures and teacher layoffs • Youth who cannot afford college or are otherwise incentivized not to pursue higher education
Food	• Residents whose housing is located in food deserts • Ethnic minorities who don't have access to culturally appropriate food
Social & Care Services	• Residents dependent on public transportation, particularly those experiencing gentrification and segregation • Elderly who cannot access health services • Single parents struggling with childcare • Taxpayers located in areas of out-migration and a diminished tax base • Contract workers with a desire to settle in the region but find that their needs are unmet • Residents struggling with substance abuse and mental health issues
Social Cohesion & Inclusion	• Immigrants, refugees, and other minority groups • Residents located in areas of out-migration who feel that movers are taking local culture, history, and identity with them
Environmental Conditions	• BIPOC communities subject to redlining • Residents displaced by climate or environmental hazards and/or actions taken to remedy them • Residents who cannot access green space

both in and out-migration scenarios. In the case of in-migration, participants feared additional pressure on already insufficient social service systems, and in the case of out-migration, there was concern that a reduced tax base would further hinder the capacity of public institutions. Housing costs in urban areas as well as COVID-19 related suburbanization has meant that more people are living farther from their jobs, social services, and resources such as grocery stores, schools, and hospitals. Both Rust Belt and Upper Valley participants emphasized the improvement of public transportation services as the key to absorbing new populations and reducing the spatial disconnectivity of housing and other services. In contrast, Coastal ME/NH stakeholders felt that, beyond improved connectivity, the current scale of social service provision is not adequately meeting the demand of existing residents, primarily the healthcare system, and therefore more resources and institutions are necessary regardless of population change.

Stakeholders in all three regions considered how in or out migration might exacerbate current **economic opportunities**. Under the "out migration/ no in-migration scenarios" participants warned of further disinvestment and pull-out from the region, and even the disappearance of entire economic sectors, which would primarily impact workers whose skill sets are tied to dying industries. Many feared the "cascading" or "trickle-down" effects of big business departure that might lead to negative impacts on small contractors. Sectoral shrinking was connected to workforce stagnation resulting from insufficient **workforce development and training** in support of sustainable and emerging industries. Plus, in the opposite scenario there was fear that even if climate in-migration facilitated economic growth, workers might not be willing or able to settle down permanently in the region due to housing affordability and lack of social services. Several populations currently moving into the region such as college students and contract workers were identified as proxies for this, with Rust Belt and Coastal ME/NH participants highlighting the low retainment rates of college graduates and Upper Valley participants pointing to the short-term settlement of healthcare workers on travel contracts. In addition to challenges faced by the working age population, participants also identified the inaccessibility of childhood **education**. Primarily in rural areas that have seen both an aging population and overall population decline for several decades, the tax base is simply not sufficient for sustaining the education system. Further out-migration would only exacerbate this issue, forcing more school closures and teacher lay-offs. On the other hand, the return of tax dollars through climate in-migration could replenish early education opportunities, but might also raise competition with current residents for jobs in existing industries.

Food security was often discussed in tandem with both accessibility of social services and social inclusion. Perhaps surprising for a region where farming is a key economic activity, food deserts were a common theme, particularly when considering the potential pressures from in-migration on the food system. In Rust Belt communities, food accessibility issues were tied to the disconnectivity of grocery stores and housing (primarily in rural areas). Participants were concerned that if in-migration encourages housing densification in current residential areas that are already disconnected from grocery stores then food insecurity would worsen. For this reason they emphasized that where housing and transportation infrastructure are built is key. As hosts to diverse resettled refugee populations, the Upper Valley and Rust Belt regions are already facing the difficulties of providing culturally appropriate food to newcomers, a gap that would only widen if international migrants continue to resettle in the Northeast.

Table 5: Proposed Responses to Sectoral Challenges Identified by Stakeholders

Sectoral Challenges	Proposed Responses
Housing	• Inventory of safe and livable housing • Rezoning and densification • Market incentives for local ownership • Location connectivity, reduced gentrification and segregation • Diversification of housing structures and promotion of mixed-use development • Environmental remediation • Community land trusts to balance housing needs with land preservation • Partnerships with local developers • Proactive buy-outs and relocation support • Demolitions and land reclamation • Just Cause evictions • Workforce housing
Economic Opportunity, Workforce Development, & Education	• Industry diversification • Built capacity in rural areas • Capital improvement and growth plan • Living-wage ordinances and wage transparency practices • Tourism sector growth • Education and training that supports diversified sectors and emerging industries • Non-traditional education pathways and technical skills development • Accommodations for the existing workforce
Food	• Incentives for local food production • Community gardens and meal events • Culturally sensitive food options
Social & Care Services	• Public transportation infrastructure that connects housing to key services and resources • Investment in public utility infrastructure to match expanding housing needs • Collaboration between service providers (e.g. government and non-profit) • Broadband expansion • Healthcare and eldercare expansion • Childcare systems • Expansion of volunteerism
Social Cohesion & Inclusion	• “Welcoming Communities” initiatives and programing • Foster community-driven sense of place and local identity • Inclusion of cultural events relevant to new populations • Integration into civic life • Limit collaboration between police and ICE • Combat systemic racism
Environmental Conditions	• Community land trusts • Climate-resilient infrastructure • Remediation • Preservation of open space • Inventory of natural resources • Climate-social vulnerability assessment • Safe, walkable wildlife corridors • Ecosystem services appropriately valued and safeguarded • Hazard mitigation plans • Nature based solutions

Table 5: Summary of sectoral challenges and proposed responses to those challenges.

For a region that is still predominantly white, aging, and middle class, **social cohesion** and the way in which new groups moving into the region might disrupt the local social fabric was on the minds of many participants. Specific instances of xenophobia and "culture clashes," and systemically entrenched racism were used as examples to demonstrate the current hostility towards BIPOC minority groups, which might be exacerbated by inflows of climate migrants of different ethnic or racial backgrounds. In addition to social hostility, participants also underscored systemic barriers to **social inclusion** and the continued displacement and marginalization of BIPOC communities, through forces such as redlining, gentrification, and economic stratification. Cultures of NIMBYism and individualism were underscored in all three regions as key obstacles to creating "welcoming communities" and facilitating the inclusion and integration of newcomers. Beyond race and ethnicity, income inequality and generational wealth gaps were highlighted as class struggles that could worsen depending on the demographics of in-migrants. For out-migration scenarios, loss of local culture, history, social knowledge, and shared sense of place were of great concern, particularly for communities anchored by generations of local families.

Lastly, stakeholders expressed concern about current **environmental conditions** and the dual threat of climate change and in-migration placing an extra burden on the relationship between communities and their environments. The importance of balancing housing and infrastructure needs with land preservation was commonly mentioned, with preservation highlighted as both essential to protecting natural resources, many of which are embedded in local economies, as well as retaining quintessential local character and identity. Land preservation was seen as a challenge regardless of the type of population change. In-migration scenarios pose development pressures for accommodating new populations, while out-migration scenarios raise questions of cost and stewardship burden. Either way, future trade-offs must remediate histories of redlining and environmental racism that continue to plague current minority groups in the Northeast. Plus, stakeholders in every workshop pushed back against "climate refuge" narratives, reiterating that the Northeast is not without its own environmental and climate challenges. Climate hazards such as harsh winter storms, intense flooding, and mud season, are not only expected to intensify due to climate change, but could threaten the life and property of newcomers who do not know how to adequately prepare for such challenges.

Who would be impacted?

While there was a consensus that the overall quality of life in the Northeast could be improved across the socioeconomic spectrum by in-migration, current sectoral challenges disproportionately impact some groups over others. Understanding which populations are currently underserved and under-resourced is essential to gauging how the demographics of climate-in-migrant groups might exacerbate existing conditions faced by some groups over others. Participants drew out equity concerns across several key characteristics including, race, ethnicity, income, age, and employment type. Table 4 summarizes the groups across the region that are most vulnerable to the sectoral challenges previously identified.

Governance Challenges

Governance constraints to remedying current issues and planning for climate migration include governance structure, spatial distribution of inequity, local culture and politics, funding,

and the availability of data and research.

Governance Structure: Even though the impacts of climate change, migration, and other sectoral issues do not follow jurisdictional boundaries, municipal models and "home rule" in states such as New York and Maine have challenged the ability of communities to address current issues, such as the housing crisis. The absence of statewide initiatives has burdened small, under-resourced municipalities, leading to ad-hoc policies and programs at the local level and severely constraining cross-municipal strategizing. Although remedying the current sectoral challenges outlined above and planning for climate migration would require multilevel governance coordination, governance structures hinder information and resource sharing across different municipalities and across levels of government. Plus, in some cases, state-level leadership also undermines the ability of local leadership to implement the initiatives that would best serve local needs.

Spatial distribution of inequity: While race, ethnicity, and class shape equity concerns within communities, inequity is geographically distributed across the rural-to-urban spectrum at a regional level. In most of the Northeast, rural communities are disproportionately under-

Table 6: Proposed Responses to Governance Challenges Identified by Stakeholders

Governance Challenges	Proposed Responses
Governance Structure	• Expansion of regional approaches; move away from municipal models and work with neighboring communities • State support that explicitly acknowledges intersectionality
Spatial Distribution of Inequity	• Expansion of regional approaches; focus on cross-cutting similarities in places across the region
Local Culture and Politics	• Incentivize civic engagement, collective action, and participatory decision-making • Strengthening local news media • Mutual aid • Cultivation of trust in local government and strengthening local leadership • Expansion community-driven sense of place • "Welcoming Community" initiatives and inclusive public events
Funding	• Expansion of regional approaches; pooled funding and resource sharing • State-match funding • Remove funding gatekeepers • Public-private partnerships • Creative federal funding uses to address intersectional issues
Availability of Research and Data	• State-wide needs assessments • Data collection, documentation, and monitoring systems • Comparative case studies • Greater academic focus paid to "rural" issues • Scenario-based planning tools

Table 6: Summary of governance challenges and proposed responses to those challenges.

resourced compared to urban areas. At all of the regional stakeholder events, there was consensus that the reality of further population decline and climate out-migration would disproportionately impact rural communities that are already suffering from reduced tax-base impacts, whereas the impacts of climate in-migration would be more nuanced. In the Rust Belt, participants felt that urban settings would be disproportionately challenged by in-migration based on current pressures to the housing and social service systems in these locations, whereas in Coastal ME/NH in-migration was expected to challenge both rural and urban settings but in different ways. A regional approach would need to consider both local equity issues as well as the pre-existing conditions that determine the distribution of resources and wealth across areas, given that both types of equity conditions determine how places are impacted by different types of population change.

Local culture and politics: Many participants felt that collective action and participatory decision-making processes that incorporate diverse voices are essential to remedying the anticipated multi-faceted and intersectional impacts of climate migration. However, many also shared pessimistic opinions about civic engagement rates across all three regions. In Rust Belt communities, years of disinvestment has led to feelings of abandonment and government distrust among residents. Coastal ME/NH stakeholders articulated that population decline has led and will continue to lead to feelings of isolation and loss of communal sense of place, which could deter future civic engagement if residents begin to feel like there is no point in participating in local decision-making as more of their neighbors and community members leave. Plus, Upper Valley and Coastal ME/NH participants explained how feelings of abandonment have previously culminated into fears of "others" in-migrating, resulting in xenophobia, anti-semitism, and other hateful reactions towards racially diverse in-migrants, which could continue to pose a political obstacle to local government intentions to attract climate in-migrants.

Funding: Insufficient funding to address current community needs and plan for climate change and migration at both local and state levels was identified as another key governance challenge. While the inaccessibility of funds is shaped by a variety of factors across Northeastern states, continued out-migration in many rural areas reduces the taxbase and further limits local funding. Participants explained how even when grant opportunities are available, municipalities struggle to fund the staff capacity to complete applications. When funding is accessed, siloed deliverable requirements and grant timelines make it difficult to create intersectional or system-level change in the long-term. Many attendees called for pooled or aggregate regional funding opportunities across municipalities.

Availability of research and data: Participants at all regional events expressed frustration about building capacity to deal with climate migration impacts with such limited projections about the size and timing of population change. Many expressed concerns that data follows funding, and that if funding continues to be siloed, what is and is not studied will also be confined. Particularly for Rust Belt stakeholders, an academic shift towards "rural issues" was also called for, given that research opportunities housed at universities in cities and towns bias towards those settings.

Responding to Climate Migration Challenges

Individual, community, and business relocation to and within the region can exacerbate many existing challenges, but local and long-distance migration also offer the economic energy, generational spatial reorganization, and political space to consider how communities see themselves moving forward. Workshop participants identified a range of responses to each of these challenges, suggesting that positive action is not unknown but requires leadership, vision, and capacity. Above all, they indicated the imperative of strengthening regional governance, both through expanded government capacity as well as coalition, partnership, and network building. There was support for local regionalism to overcome limitations of inequitable municipal capacity as well as multi-state regionalism that supports the exchange of experiences and lessons learned across states with similar climatological, demographic, and economic contexts. Although adopting regional approaches to climate migration governance was seen as the number one solution to addressing both sectoral and governance challenges, participants also highlighted the extent to which equity concerns are inherently place-based, and thus solutions will require strong engagement with local values and interests. These ideas are reflected in Tables 5 and 6.

Conclusion

The NEST regional stakeholder events revealed trends in northeastern communities' capacity to become sending and receiving locations of climate migrants. Importantly, participants emphasized that these processes will likely occur in tandem, as populations move to the Northeast and *within* the Northeast. While climate impacts will surely affect the Northeast, there will still remain tremendous opportunities for hosting new populations while simultaneously uplifting current ones. Each of the four engagement events were characterized by an air of enthusiasm and desire to continue the important conversations started by the NEST team, but also an acknowledgement that the issues underlying climate impacts are "old" ones around housing and economic development that have been challenging to address at the scale of the need. Beyond improving the quality of life in the Northeast, climate migration has the potential to give new vibrancy to local identities and a renewed sense of place to many communities. Coalition building and regional collaboration were seen as the most appropriate way forward.

The Northeast's Climate Adaptation Policy Landscape

The sectoral and governance conditions that constrain climate and migration preparedness identified by stakeholders beg the question, "to what extent are intersectional equity concerns addressed by state climate policy?" To improve understanding about if and how the challenges and opportunities of climate migration are currently, and can be addressed in future climate policy, we examined the status of climate action plans in the Northeast. Our review complements the assessment done by Dalal & Reidmiller (2023) as a technical input into the Fifth National Climate Assessment. Our review focuses on the following key documents, which are listed in Table 8: *Maine Won't Wait: A Four-Year Plan for Climate Action* (2020), *Massachusetts State Hazard and Mitigation Plan (SHMCAP)* (2018), *New Hampshire Climate Action Plan* (2009), *New York State Climate Council Scoping Plan* (2022) and the *Vermont Climate Action Plan* (2021). It should be noted that while all states in the Northeast have a hazard mitigation plan in place as a requirement for FEMA funding, we only reviewed this type of plan for Massachusetts. Although Massachusetts passed the *Clean Energy and Climate Plan for 2025 and 2030* (2022), it narrowly focuses on climate mitigation through the energy transition, and thus SHMCAP (2018), which includes more substantive similarities with the other state climate action plans, is more relevant for this analysis. While all plans are considered guiding legislative frameworks for climate action, states vary in the extent to which they have created enforceable targets and measurable goals in support of the climate plans' intentions. We systematically reviewed the plans for their discussion of (1) climate migration and (2) the intersectional sectoral issues identified in NEST stakeholder engagement sessions. It should be noted that due to time and capacity constraints, we did not analyze the extent to which state legislation in other sectors such as housing, transportation, and economic development, discuss climate change or climate migration impacts or the additional climate legislation that has followed some climate plans in order to address gaps or bolster implementation (also listed in Table 7).

This review of state climate action plans reveals three main findings. First, state plans have done little to acknowledge and address the potential for localized climate displacement or longer-distance climate-related migration, let alone the intersectional implications of these moves. Instead, in keeping with global policy trends, adaptation which would include planning for future population change, comes second to mitigation efforts and the unanimous focus on reducing greenhouse gas emissions. Second, while Vermont and Maine have emerged as pioneers of inclusive and equitable mitigation and adaptation planning to a greater extent than other states in the region, all state climate action plans give disproportionate attention to the economic and infrastructure opportunities resulting from climate change, while far less is given to housing, social and care services, food accessibility, and social cohesion. However, it is these sectors that are essential to helping the region retain existing residents, attract new ones, and promote more equitable and just futures. Lastly, the similarity in adaptation and mitigation approaches, issue gaps, and proposed solutions, in each state's climate action plans suggests that the coalescence of a regional

Table 7: Climate Action Policy in the Northeast

	Climate Assessments	Adaptation + Mitigation Plans + Policies	Implementation	Additional Climate Legislation
ME	ME Climate Science Update (2021) Scientific Assessment of Climate; Change & Its Effects in Maine (2020)	Maine Won't Wait: A Four-Year Plan for Climate Action (2020); Maine State Hazard Mitigation Plan (2019)	Two- Year Progress Report (2022); One-Year Progress Report (2021); Maine Won't Wait Implementation Dashboard	
MA	MA Climate Change Assessment (2022); MA Climate Change Projections - Statewide and for Major Drainage Basins (2018)	MA State Hazard Mitigation and Climate Adaptation Plan (2018);	Municipal Vulnerability Program; MA Environmental Bond Act (2018)	2025 and 2030 Clean Energy and Climate Plan for 2030 (2022); MA Clean Energy and Climate Plan for 2050 (2022); An Act Creating A Next-Generation Roadmap for Massachusetts Climate Policy (2021)
NH	NH Climate Assessment (2021); NH Coastal Flood Risk Summary, Part I: Science (2019) NH Coastal Risk and Hazards Commission Report (2016)	NH Climate Action Plan (2009); State of New Hampshire Hazard Mitigation Plan (2018)	NH Coastal Flood Risk Summary, Part II: Guidance for Using Scientific Projections (2020)	SB 285 (2019); Community Revitalization Tax Relief Incentive (2017)
NY	Responding to Climate Change in New York State (2011, 2014 updates, 2021 ongoing update)	New York State Climate Action Council Scoping Plan (2022);	New York State Environmental Bond Act (2022)	Climate Leadership and Climate Protection Act (2019); Community Risk and Resilience Act (2014)
VT	Vermont Climate Assessment (2021)	Vermont Climate Action Plan (2021); Vermont State Climate Hazard Mitigation Plan (2018, 2023 update in progress)		Vermont Global Warming Solutions Act (2020)

Table 7: This table consolidates climate action governance for the Northeastern study states. For a more comprehensive discussion of all relevant climate legislation in the Northeast please see Dalal and Reidmiller (2023).

climate strategy might be a practical undertaking for the Northeast in coming years, particularly as it would enable heightened resource and information sharing, reduce capacity burdens, and improve consistency and quality. Beyond the climate action plans reviewed in this analysis, policy learning and transfer seems eminent, with approaches continuously evolving across states and different levels of government.

Climate Action Policy in the Northeast Prioritizes Mitigation

The climate plans in the Northeast are some of the most ambitious in the U.S, particularly in their innovative approaches to greenhouse gas reduction and the energy transition. All state climate action plans besides New Hampshire's were created or updated in response to US federal level pull out of the Paris Agreement in 2017, and therefore are intended to take state level action in line with the Agreement, which sets a goal to "hold the increase in the global average temperature to well below 2°C above pre-industrial levels" and pursue efforts in greenhouse gas emission reduction "to limit the temperature increase to 1.5°C above pre-industrial levels" (UNFCCC, n.d). All states outline the target of 80-85% emissions reductions of 1990 levels by 2050.[1] To achieve this target, "maintaining" current ways of life has been paramount in mitigation strategies, with efforts to adjust emissions reduction strategies to current economic systems and ways of living (Reidmiller et al., 2018). In light of this, mitigation focus areas across state plans include decarbonizing current economic sectors such as agriculture and construction, investment and job creation in the clean energy sector, and reducing emissions within the transportation system. It should be noted that all states except New Hampshire, which has seen the least recent climate action progress, have passed additional legislation to enforce targets and measure reductions progress.

Emerging Progress on Adaptation Planning and Migration Considerations

While state climate plans converge on their mitigation goals and the strategies pursued to achieve them, they vary to the extent to which they center adaptation planning. For instance, adaptation is discussed most extensively throughout Maine's climate action plan, whereas New York's plan primarily focuses on mitigation, and dedicates one chapter to adaptation at the end of the report. The primary adaptation focus across all state plans is on physical resilience of natural and built environments with specific measures to adapt housing, buildings, infrastructure, and energy sources as well as protect natural systems through adaptive land use and protection strategies. However some states, and most notably Maine, go beyond this focus and more holistically consider the social and demographic determinants of climate vulnerability in their adaptation responses. Noteworthy examples of these efforts include Maine's Community Resilience Partnerships, Massachusetts' Municipal Vulnerability Preparedness (MVP) Program and Department of Public Health preparedness plans, Vermont's creation of the Rural Resilience and Adaptation Subcommittee, and New York plan's recommendation of community resilience assessments and audits.

Within adaptation planning discussions, the projected movement of people into, out of, or around the region also varies across state

1 This emissions target is either explicitly stated in the climate action plans reviewed in this section or has been enacted by separate legislation and referenced by the climate action plans for all states except Massachusetts, which outlines this goal in the *Clean Energy and Climate Plan for 2050* (2050 CECP) that was passed after SCHMAP (2018).

climate action plans. Only Maine and Vermont mention climate migration in their climate action plans, although they consider its implications quite differently. As a result of the current social sensitivity around population growth that has stemmed from housing challenges exacerbated by amenity migration during the COVID-19 pandemic, Vermont's plan exclusively focuses on the pressure that climate migration has placed on housing, infrastructure, and land use. Interestingly, the Vermont plan only mentions the challenges of climate migration, with no exploration of how it might be economically and socially beneficial. In contrast, Maine's climate plan mentions climate migration only once, but discusses it as an opportunity rather than a burden: "Maine should anticipate the potential for growth, development, and economic opportunity as people migrate to Maine seeking refuge from severe climate impacts affecting other parts of the country" (Maine Climate Council, 2020: 89). It should be noted that both states focus on climate in-migration, with no

Table 8: Framing of Sectoral Issues in State Climate Action Plans

		New Hampshire Climate Action (2009)	New York Climate Scoping Plan (2022)	Maine Won't Wait (2020)	MA Hazard and Mitigation Plan (2018)	Vermont Climate Action Plan (2021)
Housing	Energy efficiency	✓	✓	✓	✓	✓
	Building resilience & weatherization	✓	✓	✓	✓	✓
	Green building materials		✓	✓		✓
	Avoid development in climate vulnerable areas	✓				
	Increasing housing density and mixed use development	✓				✓
	Increase affodable housing development					✓
Economic Opportunity, Workforce Development, & Education	Invest in new and sustainable industries	✓	✓	✓	✓	✓
	Increase broadband access			✓		✓
	Workforce development that supports key growing industries	✓	✓	✓		✓
	Education and workforce training about climate risk and resilience	✓		✓	✓	
Food	Incentivize locally grown food distribution and consumption		✓	✓		✓
	Support farmers to adopt sustainable agricultural practices		✓			✓
Social & Care Services	Investment in resilient infrastructure	✓	✓	✓	✓	✓
	Tools to assess the needs of socially vulnerable populations		✓	✓	✓	✓
	Disaster response systems of mutual aid					✓
Social Cohesion & Inclusion	Address past and current inequity	✓	✓			✓
	Equitable distribution of the benefits of climate mitigation and adaptation		✓	✓		✓

Table 8. State climate action plans were coded for the solutions they proposed in line with each sectoral challenge. The solutions that (a) were the most emphasized by individual plans and (b) that appeared most often across plans are synthesized in this table.

mention of coastal retreat or other forms of out-migration due to climate change impacts within or across state borders. There is some indication that policy discussions of climate migration are on the horizon in Massachusetts, after the Massachusetts' Climate Change Assessment (2022) emphasized the urgent governance costs of climate migration. An updated version of the state plan that incorporates findings from the Assessment is expected by the end of 2023.

Focus on Economic Development and Infrastructure Resilience Issues over Other Sectors

As presented in Section 3, NEST findings and empirical evidence argue for the weight of intersectional equity considerations in climate and migration planning, including questions of housing access, social services access, economic opportunity, job and workforce development, food security, and social cohesion and inclusion. By comparing the way that these sectors are currently considered (or not) in state action plans (Table 8) the following discussion illuminates gaps in current climate policy. The most important findings are:

- Housing resilience and decarbonization, discussed in conjunction with infrastructure, and economic opportunity, discussed in conjunction with workforce development, are the sectoral issues that are most explored by state climate plans;

- Equity and justice are predominantly addressed in relation to housing;

- All states except New Hampshire have established committees to directly address equity and inclusion, but their mandates are still predominantly focused on environmental justice in mitigation practices rather than adaptation planning.

- Most plans fall short of systematically examining equity challenges through a climate lens and climate challenges through an equity lens (Vermont's plan comes closest to a holistic examination of equity dimensions).

Housing

Although empirical evidence and NEST findings presented in the previous section indicate that housing availability and affordability is one of the most pressing issues facing Northeastern communities, it is only discussed to a very limited extent in state climate adaptation plans. Very rarely do the plans consider the potential for sea level rise, flooding, or other hazards to reduce housing supply, the impact of in-migration (including in the decarbonization sector) or rising flood insurance premiums on the cost of housing, or the barriers to increasing and shifting housing production in the region. Even when the housing crisis is connected to mitigation measures, state climate plans primarily address it in regards to energy efficiency and lowering GHG emissions and not in terms of affordability or availability or how this could be exacerbated by climate change. *Even Maine's Maine Won't Wait Climate Action plan*, which was dubbed the "best sustainability plan in the country" by the American Planning Association (Pingree & Loyzim, 2022), lacks a clear strategy to increase housing availability for current and future residents. Where population growth and in-migration are recognized in the plan, they are discussed in conjunction with land use planning rather than specifically housing availability (Maine Climate Council, 2020). Although managed retreat is discussed in other

Maine policies, the Climate Action Plan makes no mention of movement away from coastlines which would have impacts on inland housing supply. New York, New Hampshire, and Maine, almost exclusively focus on energy efficiency, with some discussion on the physical resilience of buildings. In most cases, structural resilience is discussed in the disaster context in tandem with infrastructure rather than an exclusive focus on housing, with weatherization strategies proposed as the key solution.

Vermont and Massachusetts have paid more attention to housing equity concerns. The Massachusetts plan takes significant strides towards linking social vulnerability determinants and climate risk to considerations of housing resilience, and proposing actions such as climate adaptation guidelines for state affordable housing and voluntary private property resilience audits. Of the five plans, the Vermont plan most explicitly addresses housing equity considerations and the potential of housing and infrastructure adaptation projects to cause displacement. The plan proposes following "smart growth" principles and including "the voices of those most impacted by climate change, and work towards correcting past inequity (e.g. lack of investment or representation in infrastructure development) while preventing the exacerbation of existing inequities (e.g. investment cannot lead to displacement)" (Vermont Climate Council, 2021: 221).

In addition, the Vermont plan's discussion of housing stands apart from the rest as the only plan to directly connect climate change and migration with additional pressures on the housing system. Published in 2021, the Vermont plan was developed in the midst of the housing crisis that was largely exacerbated by amenity migration from cities to the suburbs and rural areas during the COVID-19 pandemic. The plan remarks that such population movement "has given us valuable insights into how the housing market could be affected by climate migration, and presents an opportunity to proactively plan for housing rehabilitation and development that can meet the demand for housing while improving the resilience of the people living in it" (Vermont Climate Council, 2021: 162). One of the key actions the plan proposes to balance increasing the three seemingly competing interests of housing demand and sprawl, land preservation, and climate resilience, is investment in compact settlements that enable increased walkability and connectivity to services.

Economic Opportunity, Workforce Development, and Education

Of all the sectoral challenges stakeholders highlighted in our regional workshops, economic opportunity and workforce development are the issues that receive the greatest coverage in state climate plans. Economic opportunity related to both climate change and climate migration is primarily framed in a positive light across state climate plans, with emphasis on sectoral expansion related to changing climate dynamics and in-migration. As both a political selling point and economic investment incentive, job opportunities and economic growth are heavily connected to the clean energy transition, emission reductions, and decarbonization. Particularly in Maine, Vermont, and New York, there is emphasis on workforce development strategies that intentionally focus on such "green industries," proposing workforce growth incentives particularly in the clean energy sector. Aside from attracting new workforces to green sectors, plans also emphasize bringing training and adaptation education to current industries and employees. For instance, Vermont seeks to expand "green building" training to contractors in the construction industry and climate

adaptation training to farmers and land managers. Similarly, New York outlines measures to provide decarbonization training in industries that are dependent on high-emission technologies.

Beyond the support of emissions reductions goals, Maine is the only state that considers the potential economic and labor force benefits of climate migration. The plan sets the goal of creating a workforce initiative "that establishes ongoing stakeholder coordination between industry, educational, and training organizations to support current and future workforce needs" (Maine Climate Council, 2020: 13). Although there is no explicit connection made between climate in-migration and workforce development by other state plans, Vermont and New Hampshire join Maine in outlining efforts to expand broadband access in rural areas. Treating COVID-19 amenity movers as a signal of what might be to come, broadband access is a strategy that both improves remote work opportunities available to current populations and anticipates the needs of future populations.

At the same time, economic opportunity is also discussed negatively in some state plans, highlighting the detrimental impact that climate change will have on particular industries and the potential increased competition for local jobs due to climate migration. This is of particular concern for states whose primary economic activities are tied to climate vulnerable industries. Maine has noted concern over the impact of increasing ocean temperatures on their fishing industry and increasing air temperatures on industries that require outdoor labor such as construction and farming. The Vermont plan proposes measures to support the workforce of the working lands sector, presumably to foster climate resilience and adaptation because it is one of the most climate-at-risk sectors, although that aim is not explicitly stated. In tandem with discussion of reduced economic opportunity, there is some (albeit minimal) discussion of negative workforce impacts, particularly regarding the endangerment of worker health and safety in climate-affected sectors.

Social and Care Services

Although public sector social services are necessary for current and future populations to meet daily needs and adapt to climate change, state climate action plans do not directly address the accessibility of social services. From our engagement workshops, stakeholders identified services like child care, elder care, and health care as essential services to welcome in-migration, and retain and support existing residents through climate impacts. In some instances, the improvement of existing infrastructure, transportation networks, and housing density are indirectly linked to improved access to social and care services, particularly in the Vermont plan. However, the overarching focus across all plans remains on the resilience and decarbonization of infrastructure and transportation and lacks a clear connection between how climate change and climate migration will redistribute the location of housing and economic activities and thus where residents are in need of social services. Massachusetts' state plan is the only plan that makes reference to government social services, but focuses on the impact of disasters on the demand for such services, rather than providing general services and care in support of both current challenges faced by residents in their daily lives and climate adaptation (Executive Office of Energy and Environmental Affairs, 2022). In fact, the plan seems to only consider the potential that the state population will continue to decrease, citing decreasing tax revenues as a challenge for increasing disaster response services. Similarly, the Vermont plan mentions the importance of mutual aid networks in addressing population needs, but again primarily focuses on their place

in disaster recovery. Federal policy focus on disaster response is echoed in state plans along with a general neglect for the necessity of social service accessibility to cope with intersectional sectoral and climate challenges in the long term.

Food Security

State plans focused on the impacts of climate change for the agricultural industry, rather than on local food access or compounding demands on land under climate migration. Although the Maine and Vermont plans both listed local food access as a priority, farmland productivity was rarely considered beyond the acknowledgment that agricultural outputs will be impacted by climate change and that we need to increase the adaptation capacity of farmers. For instance, Maine's climate plan focuses on protecting economic value and the profitability of agriculture rather than local food security: "Maine should provide information, tools, and technical assistance to enhance farm resilience and profitability in the face of climate change" (Maine Climate Council, 2020, 69). While the plan lists recent legislation that is aimed at increasing state purchasing of Maine grown food and the establishment of wider New England-based agricultural networks, local production and consumption still seem to be positioned as a means to preserve profitability rather than enhance food security (Maine Climate Council, 2020). Farmland preservation is discussed to a minimal extent across state plans, primarily related to land use planning for carbon storage mitigation rather than a means to protect local food supply. State plans do not consider how climate migration poses land use pressures and tradeoffs between housing development, agriculture production, and accommodatingincreased demand for locally-grown food.

Social Cohesion and Inclusion

Although NEST stakeholders sounded alarms about current social cohesion issues in the Northeast, stemming predominantly from class struggles, racism, and xenophobia, state climate plans fail to address how climate change and climate migration might exacerbate current social fractures. Vermont's plan comes closest to breaching cohesion issues, in its exploration of how housing competition in the pandemic's aftermath has worsened "housing fairness, equity and justice issues" but still fails to mention how this has spotlighted both class and racial tensions (Vermont Climate Council, 2021: 29).

Instead, state climate plans focus on social inclusion in environmental justice strategies, indicating an expanded awareness about a) how past climate mitigation and adaptation strategies have directly and indirectly contributed to the marginalization and displacement of minority groups, and b) how the benefits of climate mitigation and adaptation have accrued unevenly across racial, ethnic, and class lines. In this sense, the approach to social inclusion is to avoid, and in a smaller number of instances rectify, the past harms of climate adaptation and/or community development policies. For instance, the Vermont plan advocates for rectifying past and current housing and infrastructure inequity, while Massachusetts seeks to "identify adaptation and resiliency strategies that address health and racial equity" (MEMA, 2018: 7-20). In Maine, the primary focus is to ensure "shared benefits across diverse populations" of climate adaptation and mitigation strategies (Maine Climate Council, 2020: 37). Of all state plans, New Hampshire's plan engages the least with equity and inclusion issues (in fact, neither "equity" or "inclusion" appear anywhere in the plan), whereas the Vermont plan far exceeds the others in the way that it centers equity and inclusion throughout all mitigation and adaptation solutions.

The proposed responses range from inaction, to prioritizing low-income and racialized minority groups in disaster response and climate adaptation investments, to redressing the underlying causes of inequality. New York, Vermont, and Maine plans establish equity-focused subcommittees. Their mandates include incorporating diverse and marginalized voices in the planning process, conducting needs assessments to understand compounding climate and social risk determinants, and monitoring equity metrics. It should be noted that Massachusetts has also established an equity oversight body for climate policy, the Environmental Justice Council, in separate legislation passed in 2021, which prioritizes adaptation resources and ensures benefits predominantly on the basis of income and socioeconomic status. Importantly however, New York, Vermont, and Massachusetts' equity committees were designed in support of goals of the "Just Transition," considered primarily with ensuring an inclusive and equitable energy transition and decarbonization process. While this is certainly a valuable step towards climate justice, this focus is again evidence of the chief preoccupation with mitigation over adaptation in state climate action plans. All four states fail to enumerate how equity considerations might shift as demographics change due to climate migration. At the same time, despite this and the current focus on the "just transition," the establishment of these equity-focused legislative guidance bodies could prove to be an essential step in institutionalizing capacity to manage questions of equity, inclusion, and justice in the face of future population change.

Conclusion

Shared policy priorities and gaps as well as distinct areas of leadership demonstrated by individual states provide an opportunity for regional learning, exchange, and policymaking, including through an Upper Northeast Climate Adaptation Partnership. With mitigation as the overarching concern of state climate action plans, states across the Northeast share priorities for rapid greenhouse gas reduction, increasing the equitable accessibility of clean energy, and creating economic opportunity in "green" sectors. Although adaptation planning still comes second to mitigation, Northeast states also share similar goals for improving community resilience, emphasizing improved built infrastructure and natural ecosystem resilience. States that have incorporated more expansive adaptation goals that go beyond physical environmental resiliency to consider social risk determinants of household-level resiliency, such as Maine and Massachusetts, set important examples for other states to learn from. While all states stress the tremendous economic opportunity in growing new "green" sectors and workforces, some states have incorporated planning on housing, social and care services, and equity and inclusion.

Formalizing regional level action across adaptation strategies in these sectors and regularly updating state plans can help streamline supply chains and implementation, and amplify their importance in dissemination and policy circulation. Most states could improve how well they address projected climate migration and population change in both mitigation and adaptation policies. While specific implementation strategies depend on local conditions and political will, regional collaboration may provide opportunities to expand state capacity and programmatic impact, particularly in the face of uncertainty about how, when, and where people will move.

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ROADMAP FOR A CLIMATE ADAPTATION PARTNERSHIP IN THE UPPER NORTHEAST

Overarching Need for Regional Collaboration

Our review of the Northeast's historic demographic fluctuations, projected demographic change, and states' preparedness for climate migration in the areas that stakeholders identified as important to climate migration reveals the following observations:

- To ensure the region can accommodate local and long-distance migrants and adapt to climate change, **the Northeast must address strategic, intersectional drivers of existing vulnerability while anticipating changing demographic trends.** This means addressing housing unaffordability, promoting regional economic development, and providing care-related services in addition to updating infrastructure, a central focus of states' climate policies and plans that is now reinforced by federal funding flows. At the same time, if the region only focuses on the fierce urgency of the "now", they may be unable to meet certain goals due to the impacts of climate change. States may also miss opportunities to leverage funding for an economy-wide clean energy transition and the economic opportunities presented by climate migration. For instance, the region's need for labor to operationalize its decarbonization goals, its lack of affordable, climate-resilient housing, and the fragmented regulation of worker certification create a space where multiscalar collaboration can jointly address linked challenges. Tackling these challenges in an integrated manner creates opportunities for "multi-solving" but also requires new ways of working across disciplinary and geographic boundaries.

- **The Northeast needs to develop the capacity to engage in difficult, emotional conversations around migration and its implications.** Past migration in or out of the region has led to or exacerbated discrimination, displacement, exclusion, and xenophobia, although the region also has positive examples of two-way cultural learning, migrant integration, and economic and cultural revitalization. However, plans and policies often focus on material outcomes and skirt these emotionally fraught and controversial processes of change. This can limit investments in processes that promote dialogue and learning. Migration can provide a reason to open space for this kind of dialogue, which typically unearths long-standing tensions, mistrust, and collective pain that need to be heard and addressed in order to achieve shared understanding and integrative problem-solving.

- **The small size and home rule government of many communities in the Northeast challenge actions responding to these gaps.** For one, while some parts of the region are highly aware of the impacts of climate-related migration, especially if they received many COVID-era in-migrants,

others are unaware of how climate migration may affect local development and why it is a pressing topic. Additionally, the region's small towns and villages often have very limited governmental operating and/or planning capacity, some of which are run by volunteer officials and staff. These governments – and even many regional planning organizations or commissions – struggle to serve their constituents' needs. This translates into burnt out staff and overworked frontline workers, who have limited capacity to address the additional and compounding challenges that climate change and climate-induced migration brings. In some areas, networks of nonprofit and community organizations have formed effective coalitions that create economies of scale, but these networks are usually either sectorally or geographically limited in scope. While the region is home to many universities and research centers (we identified nearly four dozen working on economic development, governance, housing, and health), these are also fragmented by discipline and geography.

What a NOAA Climate Adaptation Partnership (CAP) Could Contribute

These overarching takeaways highlight **the importance of regional efforts to help the Northeast develop integrative strategies in response to complex challenges.**

Participants at the 2023 Local Solutions Conference[1] suggested that a NOAA CAP for the Upper Northeast could help the region build the capacity to address climate-related migration by: 1) providing research and information on climate migration; 2) convening and facilitating peer-to-peer and bridging dialogues to enable learning, education, and public communication; 3) pooling technical assistance capacity to build governance capacity; and 4) pursuing funding as multi-jurisdictional collaboratives. Below, we describe each of these areas in greater depth.

Conduct Policy-Relevant Research

Stakeholders see a role for a CAP that can conduct novel research that offers economies of scale and opportunities for cross pollination of knowledge. We identified research gaps that constrain policymaking related to anticipating the impacts of climate migration. First, there is insufficient information on how many people would move within and to the Northeast as a result of compounding, multiple hazards regionally and around the country – and when this might happen. While some demographers have projected impacts due to sea level rise and flooding, little is known about tipping points for heat, wildfire, and drought, or chronic and repetitive hazards. Regionally, little is known about how migration dynamics differ at local, metro, state, and regional levels, and how intermediate and final destination migration choices intersect with local climate vulnerability, local out-migration, displacement, housing markets, job availability, among others.

Second, research has focused on an individual's propensity to move, but little work has been done to examine tipping points for businesses and their incremental likelihood of moving to the Northeast due to, for instance, perceived availability of water and lower likelihood of extreme events. These moves are likely to have far greater impacts on migration, particularly long-distance relocations into the region. For example, Micron's opening of a new $100 billion chip plant in Syracuse took advantage of state subsidies and decades of

1The conference website can be found here: https://communityresilience-center.org/conferences/2023-local-solutions-climate-migration

planning to provide infrastructure at a large greenfield site, as well as an assurance of ample water supplies. The plant will create an estimated 50,000 jobs in a metro region with 421,000 people.

Third, there are few case studies or typologies of communities based on their existing socio-economic conditions, projected climate conditions, and relationship to possible climate migration. We began to develop case studies of communities, which surfaced drastically different conditions, particularly along urban-rural divides. Typological communities would simplify policy responses, and help policymakers to develop more targeted supports and tools for climate adaptation that anticipates migration.

Fourth, policy-engaged research can help identify best practices based on empirical evidence, embed itself as part of government and community grant proposals, test and experiment with novel approaches, and monitor and assess the results. Such efforts can inform debates within research, as well as support evidence-based policy reform and evolutionary practice. Engaging practitioners in this process will help enable policy adoption. For instance, numerous stakeholders identified the existing property tax system as impeding land use change that is adaptive, equitable, and welcoming. What alternative taxes or design of taxing districts would enable a better outcome? Or, as another example, since many small towns lack adequate planning capacity, how effective are alternative structural responses to collectivizing adaptation responses such as regional utilities? Testing questions like these in federally-funded projects would help enable learning for subsequent broader scale reforms. Moreover, designing research-practice projects across the region would enable multi-site comparative research around geographic, developmental, climatological, and/or procedural variation.

Convene Bridging Dialogues

Climate adaptation, as a cross-cutting challenge, requires whole-of-community participation. Discordant adaptation efforts by private, public, community, and individual actors can produce uncoordinated, inefficient, and ultimately maladaptive outcomes. There are disconnects between housing and social service organizations and climate resilience professions, as well as between the research, local government, and nonprofit communities of practice with private sector actors that finance and implement the key sectors affecting adaptation. Private companies like Climate Alpha are using machine learning to compile 1,500+ datasets to help investors identify where to go to achieve the greatest return on investment given climate change. The effects of industry actions, including insurers, lenders, and credit rating agencies, to migrate private capital under climate change are little studied or put into conversation with municipal, community, and academic practitioners. Putting housing and social service organizations, climate resilience planners, and private sector actors in conversation with each other would strengthen the sustainability and justice of future initiatives and investments.

Deep pathway-shifting change to adapt to climate change and related migration in the region requires changing individual mindsets and relationships among people and organizations, which can only come from dialogue across divisions, boundaries, and differences (Moser et al., 2019). Workshop participants argued that it is essential for a CAP to focus on policy-relevant research and adopt a stance of learning from practitioners and for practitioner needs. This too can only emerge from dialogue. Interdisciplinary research that is led by social scientists, humanities scholars, and extension staff who are trained to conduct engaged research can help convene these conversations in the comparative

safer space of academic research. Academic institutions can help and model novel ways to break down disciplinary and geographic silos in how they collaborate with one another and with practitioners to develop spaces for collective learning and support.

From our year of exploration, we see a need to connect private, public, and community actors around nexus issues – such as resilient, decarbonized, and affordable housing – to identify shared research needs, evidence-based decision-making, and opportunities for experimentation and learning. In this process, a CAP and its partner entities would first need to do substantial work to engage and build trust with organizations working with or representing low-income, rural, refugee, or BIPOC people that do not have ties with existing research groups or prioritization of climate change. This is essential work to reach and support those with the least access to climate information and influence, strengthen research relevancy, and provide wisdom borne out of struggle and lived experience. Any such research endeavors must confront the academy's historic exclusivity and harm to a wide range of identity groups that themselves require repair in order to be credible. Carefully anticipating the power dynamics of such participatory processes requires careful co-design and reflexivity.

Stakeholders also emphasized the need for a CAP to build awareness of climate impacts in the region, including around climate migration, and to develop an effective public communication strategy. In the absence of information, media reports of the potential for climate migration can actually foment fear and invite backlash. Researchers have an opportunity to help frame the public narrative about climate migration, and articulate why attention to migration is important for things that the public cares about, such as housing, food security, and workforce development. Rather than focusing on academic research narratives, an effective communication strategy would tell a story that connects with people, one that decision makers can communicate with their constituents, planners can translate for communities, non-professionals who are trusted in their communities can share, and youth find motivating.

Increase Local and Regional Government Capacity

As the above sections suggest, participants in our workshops see an opportunity for a CAP to build local government capacity and cultivate a new generation of interdisciplinary leaders. Developing regional and state capacity to provide centralized climate support services can more efficiently and effectively offer comprehensive services. For instance, rather than each municipality or county developing a flood relocation program, entire states could develop such capacity. Already, both New York State and New York City are developing standing programs for managed retreat and housing mobility, including conducting listening tours and research to learn from existing models in the country. Massachusetts may also be considering this approach. A CAP could support regional and state governments in designing, piloting, and assessing such efforts. Other strategies include regionalizing certification standards that create more open labor markets across the region, including for climate mitigation and adaptation, and enable professional migration within the region or from other places.

In addition, stakeholders identified a need for greater staff professional development. Such efforts would draw on universities' capacity in training and professional development, such as University of New Hampshire's Sustainability Institute for the New England Municipal

Sustainability Network and Antioch University New England's Climate Resilience Certificate for Professionals.

Finally, participants identified diverse examples of regionalism already operating, but none had met the need for multi-state collaboration to support integrative policy, research, and implementation around climate transitions, adaptation, migration, housing, and labor. Examples included the Northeast Regional Greenhouse Gas Initiative, Massachusetts Municipal Vulnerability Program, watershed councils like Resilient Mystic Collaborative and the Connecticut River Joint Commission, and networks like Partnership for the Public Good. While these offer important organizational models for a CAP, additional research would be needed to design one for a NOAA NEST.

Pool Funding for Regional Learning and Problem Solving

To do this work, a regional collaboration would need to attract resources to support regional learning and problem solving. Sources of federal funding can include the National Science Foundation's support for Centers for Research and Innovation in Science, the Environment and Society (CRISES), NOAA's Climate Resilience Regional Challenge, and NOAA's Climate Adaptation Partnership program. Additional sources of funding support include the Coalition of Northeast Governors for consideration as a shared climate initiative, as well as the Barr Foundation, the Boston Foundation, and the Kresge Foundation.

Conclusion

Regardless of the exact projections around climate migration and mobility, climate change will require significant spatial and social adjustment to our housing, infrastructure, ecological, and social systems. NEST's year of exploration through NOAA's planning grant has shown that climate migration and mobility – both localized and long-distance – can be an integrative and equity-centered lens through which to examine community preparedness to climate change. State governments and academic and community networks across the region have varied resource capabilities and leadership in different arenas in responding to climate migration needs and challenges. Pooling research, government, and foundation resources can enable integrative problem solving and support region-wide learning. Stakeholders across the region also indicate significant appetite and interest in such a regional collaboration. Such an approach is both efficient and timely given the emergence of climate migration in regional policy-related discussions.

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For more information about NOAA's CAP-RISA Program visit: https://cpo.noaa.gov/divisions-programs/climate-and-societal-interactions/cap-risa