A Massachusetts-Based Inquiry into the Opportunities and Barriers to Equitable Relocation away from Coastal Flood Risks

A thesis submitted by

Maggie Peard

in partial fulfillment of the requirements of

Master of Science

in

Environmental Policy and Planning

Tufts University

May 2022

Thesis Advisor: Penn Loh

Thesis Reader: Kari Hewitt

Abstract

Planned relocation, or "managed retreat," refers to a set of strategies that move people and infrastructure away from risk. The strategy is increasingly being considered and implemented across the world as rising sea levels threaten low-lying islands and coastal communities. This thesis approaches the topic through the assumption that relocation will be a necessary strategy for many coastal areas; but recognizes that the strategy runs the risk of leading to inequitable outcomes for populations that are most at risk from climate change and that have been subjected to past injustices. As such, this thesis examines the barriers to equitable relocation from coastal flood risks and the opportunities for implementing relocation in a just manner.

Beyond the literature review, the thesis is grounded in the Greater Boston area in Massachusetts. I applied the equity implications gleaned from the literature to interviews with municipal planners and community stakeholders in the metro north region of Boston, seeking to understand the barriers and opportunities for implementing equitable relocation in this specific locality. My interviewees showed a promising commitment to prioritizing equity in coastal resilience planning but reported a lack of preparedness to take on the process of relocation in the short term. This research suggests the need for stronger regional planning efforts, longer planning horizons, and greater support for municipalities from state and federal governments—all of which would increase the area's capacity to prioritize equitable outcomes in future relocation planning efforts.

Acknowledgments

Thank you first and foremost to Penn Loh and Kari Hewitt for helping me craft my research questions and methods, and for providing valuable feedback every step of the way. Thank you to my classmates at UEP who talked through ideas with me and supported me throughout the process. Thank you to all my interviewees and other informants who took time out of their busy schedules to share their expertise and experiences—this thesis wouldn't have been possible without you. And finally, thank you to my friends and family who were there through all the highs and lows of writing a thesis.

Table of Contents

Introduction

In 2018, 41 million Americans lived in a 100-year floodplain.[1] That is over 12% of the country's population. This number is estimated to increase by 40% by 2100.[2] This is just one of a countless number of statistics that could be used to communicate the realities of the climate crisis. We are facing a future in which significant portions of the country's land will become nearly uninhabitable due to sea level rise, extreme heat, wildfires, and other climate-change-induced stressors. Even if the world takes dramatic action to curb greenhouse gas emissions, many of these effects are already locked in. Entire communities—especially coastal ones—will face a choice between dramatic and expensive adaptation approaches or relocation. In this context, relocation away from climate hazards is often called "managed retreat," "supported retreat," or "planned relocation."

Some communities—both in the United States and abroad—are already pursuing or considering relocation away from flood risks. In 2019, Indonesia announced a $33 billion dollar plan to relocate its entire capital city because of the increasing rate and volume of urban flooding.[3] The plan entails relocating Jakarta, along with 7 million people, 1,250 miles northeast to the island of Borneo. In the United States, cities like Miami will also face permanent inundation, and will need to contemplate relocation. The choice between adaptation and relocation is happening at a smaller, more individual scale as well. As an extreme example, there is a house in Mississippi that has been rebuilt 34 times in 30 years on account of flood damages.[4]

[1] Pilkey, Orrin, Sarah Lipuma, and Norma Longo (2021). "Retreating From the Waves."
[2] IBID.
[3] IBID.
[4] Kath, Ryan and Jim Haddadin (2020). "Rising Seas: Time for Mass. Towns to Retreat from the Coast?" NBC Boston.

Relocation planning is happening and will only be more necessary in the future. However, the issue is riddled with complications, the first of which is how hard it is to acknowledge the need to consider relocation as a coastal adaptation strategy. The very idea of relocation can pose a threat to people's communities, cultures, and ways of life. Beyond the stigma or controversial nature of the strategy, relocation presents serious equity concerns, including disparate outcomes across racial and socioeconomic lines, financial and cultural impacts on affected communities, and imbalanced power dynamics between governments and individuals.

This thesis explores the complications surrounding planned relocation with an eye towards solutions. It draws from experts who have already done research on equitable relocation planning, while contributing an analysis grounded in interviews with stakeholders in Massachusetts. Ultimately, this thesis seeks to answer the following question: **What opportunities exist to integrate relocation planning into coastal resilience planning efforts in Massachusetts communities in a way that prioritizes equitable outcomes, especially for environmental justice populations?** This inquiry is focused primarily on residential relocation and the impact on residents.

I was drawn to this topic by experiencing firsthand the extent to which many municipal planners shut down at the mention of relocation planning and my own recognition that this type of planning will be necessary despite its challenges. Through this work, I seek to highlight the need for community-led, proactive relocation planning that prioritizes equitable outcomes for those who have been historically harmed by past land use and planning decisions. While the findings of this thesis will be most informative for Massachusetts planners, I hope there are takeaways that can be applied to regions across the country.

Methods

Literature Review

First, I conducted a literature review on the topic of planned relocation with a focus on factors that influence equitable outcomes. I drew research from academic papers, practitioner guides, and media reports of current relocation efforts. The review includes a basic overview of planned relocation, including a history and trajectory of its use in the United States and the key mechanisms through which it is implemented. Next, I reviewed the existing barriers to planned relocation, including psychological, emotional, cultural, political, institutional, financial, legal, and equity challenges. Flowing from the discussion of equity issues, I then examined emerging practices intended to improve equitable outcomes in flood risk and relocation planning. These best practices range from facilitating community-led processes to striving to reverse historic injustices. I supplemented my review of the literature with a conversation with Carri Hulet, an expert in the field of communicating about climate migration and finding human-centered solutions to flood risks.

Massachusetts Coastal Resilience Review

Following the literature review, I examined the current landscape of relocation planning in Massachusetts to contextualize the Massachusetts-based interviews. For this section, I pulled largely from local and national climate reports, official state webpages, and local media coverage. To provide the needed context, I briefly summarized the current and projected threats from sea level rise in the area, the existing agencies and funding sources available to address coastal resilience in the state, and the status of coastal resilience planning in the state, including proposed legislation to establish the Massachusetts Flood Risk Protection Program.

Interviews

In order to ground my inquiry into equitable relocation planning to a specific location, I conducted interviews with planners and community leaders in a selection of coastal communities in Massachusetts. I engaged interviewees in a discussion about their current coastal resilience planning efforts and sought to understand how relocation planning might be integrated into that work. The interviews served as a first step in assessing the feasibility of implementing the best practices from the literature review and reflecting on how some of those strategies may have to be further refined to fit into the realities of Massachusetts communities.

Interviewee selection process

I ultimately spoke with 10 individuals representing six municipalities in Massachusetts. The municipalities were selected based on their low-lying nature, current flood risks, and concentration of Environmental Justice populations. I narrowed down the options for the communities of focus based on the following selection criterion. First, I considered all Massachusetts towns and cities that fell into the top 10 of communities at risk from flooding in four categories developed by the First Street Foundation's 2020 National Flood Risk Assessment: the greatest proportion of properties at risk, greatest number of properties at risk, greatest relative growing risk, or greatest proportion with operational risk today. I then excluded non-coastal communities given the thesis' focus on coastal flooding. Next, I looked up the percentage of the population in each community that lives in an Environmental Justice census block and eliminated communities with percentages lower than 40% to ensure my case studies had an environmental justice focus. For the remaining communities, I confirmed that they have already engaged in some kind of coastal resilience planning efforts in the past. This process led me to a list of nine communities, which I then narrowed down further through initial

informational interviews with planners in the communities. I sought to interview the municipal planner in each community who was most knowledgeable about climate resilience or holistic community planning efforts based on areas of focus listed on municipal webpages and recommendations directly from municipal staff members. I also included a couple non-municipal stakeholders to have a greater diversity of perspectives. The final list of interviewees is below.

Name	**Position**	**Communities Represented**
Esmeralda Bisono	Sustainability & Resilience Coordinator	City of Salem
Aaron Clausen	Planning Director	City of Lynn
Matt Lattanzi	Director of Planning & Development	City of Everett
Darya Mattes	Resilience Manager, North Suffolk Office of Sustainability & Resilience	City of Chelsea City of Revere Town of Winthrop
Tom Philbin	Conservation Agent	City of Everett
Maria Belen Power	Associate Executive Director, GreenRoots	City of Chelsea
Frank Stringi	Floodplain Manager	City of Revere
Erik Swanson	Director of Engineering	City of Everett
Alex Train	Director of Housing and Community Development	City of Chelsea
John Walkey	Director of Waterfront and Climate Justice Initiatives, GreenRoots	City of Chelsea

Interview Process

All interviews were conducted over Zoom and ranged from 30-60 minutes. They were semi-structured interviews, guided by a list of open-ended questions. The first set of questions centered around the interviewees' experiences working on flood mitigation projects. These questions touched on current flood risks in the community and social vulnerabilities impacting residents' ability to respond to flood hazards. It also included inquiry into their experiences with issues related to relocation planning, such as difficult community engagement and displacement. From there, I provided a brief presentation, defining planned relocation and giving a summary of some of the barriers and best practices for carrying out relocation. This presentation built a

shared understanding from which to launch into the second set of questions that was more directly about planned relocation. These questions asked them to reflect on their capacity for proactive planning, their readiness for difficult community engagement, the public's level of trust in their local government, and finally asked them to imagine how residents would react to proposals for property buyouts in the future.

Literature Review

What is Relocation Planning?

Climate change is forcing communities across the globe to make tough decisions about their future. With sea level rise threatening to inundate coastal cities, wildfires ravaging forested areas, and drought limiting water supplies, many individuals, communities, and even entire countries are considering how to adapt to intensifying climate hazards. Adaptation approaches, such as building seawalls and elevating buildings, can be incredibly costly and may not offer a long-term solution. Some communities and planners are beginning to look toward a more permanent solution, often referred to as "managed retreat." Put simply by an expert on the topic, A.R. Siders, managed retreat is "the purposeful, coordinated movement of people and assets out of harm's way."[5] The term encompasses the movement of individuals, buildings, critical infrastructure, or even entire communities. While relocation is seen as a last resort in many circles, the Fourth National Climate Assessment in 2018 stated that retreat will be "unavoidable" for some United States communities.[6] The following sections will explore the landscape of relocation planning in the United States, drawing both on past efforts and the demands of the future, while outlining the key mechanisms, fundamental challenges with the approach, and emerging best practices for overcoming those challenges.

Language Choice

Before examining relocation planning in the United States, it is necessary to address the language with which we refer to this concept. While "managed retreat" may be the most widely

[5] Siders, A. R. (2019). "Managed Retreat in the United States." *One Earth*.

[6] D. Reidmiller, C.W. Avery, D.R. Easterling, K.E. Kunkel, K. Lewis, T.K. Maycock, B.C. Stewart (Eds.). (2018). Impacts, Risks, and Adaptation in the United States: The Fourth National Climate Assessment, Vol. II, U.S. Global Change Research Program.

used term, there are objections to that phrase that demand attention. The Climigration Network—a nonprofit that brings community leaders and practitioners together to generate equitable, just, community-led approaches to relocation—created a guidebook for community conversations on climate migration, which synthesizes the results of interviews that dug into the challenges of communicating about climate migration. The research team found that the term "managed" struck people as objectionably top-down, communicating that individuals do not have a say in the outcome of the process.[7] "Retreat" brought feelings of defeat, hopelessness, shame, and carries a militaristic connotation.[8] As a whole, the term suggests a lack of agency of those being relocated. As Aranzazu Lascurain from the Southeast Climate Adaptation Science Center of North Carolina State University puts it, "people and communities don't want to be managed, they want agency."[9]

Because of such objections to the term "managed retreat," planners and practitioners have put forth a range of alternative terms, including "supported retreat," "community-led retreat," "assisted relocation," "strategic transition," and "planned relocation," just to name a few. While there is no perfect term to refer to the concept, "planned relocation" will be the primary term used throughout this paper, given its emphasis on planning and the relatively neutral connotations of "relocation." Landing on this particular term for the purpose of this paper is not to imply its superiority over other choices or its appropriateness in all situations. The language used to refer to this concept should always be a deliberate choice that is responsive to local contexts and community preferences.

---

[7] Climigration Network. (2021). "Lead with Listening: A Guidebook for Community Conversations on Climate Migration."
[8] IBID.
[9] French, Kristen. (2021). "What is needed for Fair and Equitable Managed Retreat?" Columbia Climate School.

The Trajectory of Relocation Planning in the United States

Despite the lack of mainstream acceptance of relocation as an adaptation strategy, planned relocation is not new. Prehistoric tribes routinely packed up their settlements and moved to higher ground when a flood struck.[10] In modern history, scholars point to 1881 as the first well-documented relocation of an entire U.S. community: residents of Niobrara, Missouri chose to relocate their entire community to higher ground—using horses and oxen to pull their buildings—after a major flood disrupted their home.[11] Looking beyond flood adaptation, there is a long history of relocating entire communities in the United States. While certainly not the model to aspire to, the urban renewal movement involved forced relocation of entire neighborhoods to make way for highways and reimagined downtown spaces. Similarly, the construction of large-scale dams in the late nineteenth century, into the twentieth century, flooded and displaced entire communities. As Mark Davis, director of the Tulane Institute of Water Resource Law and Policy, notes "We have moved people around this country for a long, long time, sometimes with a carrot and sometimes with a stick."

Even in more recent times, relocation is not a foreign concept. After the Great Midwest Floods of 1993, Congress expanded federal authority to promote retreat by acquiring properties.[12] Since 1989, the Federal Emergency Management Agency (FEMA) has funded managed retreat in over 1,100 counties across 49 states, acquiring more than 40,000 properties.[13] *Figure 1* shows historic relocation patterns in the United States. The small dots show where FEMA and the Department of Housing and Urban Development (HUD) have funded managed

[10] Carey, John. (2020). "Core Concept: Managed Retreat Increasingly Seen as Necessary in Response to Climate Change's Fury." Proceedings of the National Academy of Sciences of the United States of America.
[11] IBID.
[12] Siders, A. R. (2019). "Social Justice Implications of US Managed Retreat Buyout Programs." *Climatic Change*.
[13] Siders, A. R. (2019). "Managed Retreat in the United States." *One Earth*.

retreat; the large dots show where entire communities have relocated or are considering it; and the stars show sites of related academic reports or studies on relocation.[14] While 40,000 acquired properties shows a start to this trend of planned relocation, it represents only a tiny fraction of the estimated 49 million housing units in coastal counties.[15] Planned relocation is happening in the United States, but mainly at small scales.

Historic relocation in the United States.

The climate crisis, however, is contributing to a growing—and more urgent—demand for long-term adaptation strategies. Global temperatures are projected to increase by 1.5°C from pre-industrial levels by 2030 to 2050 if trends continue at their current rate.[16] Even this conservative projection of global warming will lead to dangerous conditions for much of the world's population. Extreme heat, heavy precipitation, drought conditions, and wildfires are already threatening our way of life. Sea levels could rise by six feet by the end of the century, inundating

[14] Siders, A. R. (2019). "Managed Retreat in the United States." *One Earth*.
[15] IBID.
[16] IPCC. (2018). "Summary for Policymakers."

hundreds of coastal communities.[17] Research suggests that by 2050, as many as one billion people could be displaced globally by combination of climate change impacts, extreme events, and environmental degradation.[18] There is also a vast amount of infrastructure at risk from rising seas, with $1.4 trillion worth of real estate currently located within 700 feet of the coast in the United States.[19] As a result of these changes, "unmanaged retreat" is happening with increasing frequency as rising flood insurance costs and repetitive flood damage drive individuals to move away from risk. With the projections we are facing, relocation is a necessary adaptation solution to consider alongside other strategies, such as strengthening current flood protection measures and elevating existing structures.

Key Mechanisms

Before exploring the challenges associated with relocation planning, it is necessary to understand the main mechanisms through which relocation planning is currently happening. Planners today use a mix of property buyouts and other acquisition tools, regulatory tools, full community-planning efforts, and market-based tools to encourage the movement of people and assets away from areas at risk of flooding.

Property Buyouts

The most common tool that facilitates relocation is property buyouts—typically initiated by major natural disasters.[20] The majority of floodplain property acquisition programs are funding by the federal government. State and local government determine which properties they

[17] Carey, John. (2020). "Core Concept: Managed Retreat Increasingly Seen as Necessary in Response to Climate Change's Fury." Proceedings of the National Academy of Sciences of the United States of America.
[18] Ajibade, I. J., & Siders, A. R. (2021). Global Views on Climate Relocation and Social Justice (1st ed.). Routledge.
[19] Siders, A. R. (2019). "Managed Retreat in the United States." *One Earth*.
[20] Siders, A.R. & Hino, Miyuki & Mach, Katharine. (2019). "The Case for Strategic and Managed Climate Retreat." *Science*.

want to offer buyouts to, apply for federal funding, and the federal funding agency—typically FEMA or HUD—negotiates purchase offers with individual property owners.[21] FEMA offers funding through its Hazard Mitigation Grant Program (HMGP), and HUD offers funding through Community Development Block Grants (CDBG) and Community Development Block Grants - Disaster Recovery (CDBG-DR). Because both HMGP and CDBG-HR funding only becomes available after a disaster and because political support for relocation is at its highest after a disaster, most property buyouts happen in the aftermath of a disaster.[22] Buyouts funded by HMGP are required to offer pre-disaster fair market value to homeowners; whereas, CDBG and CDBG-DR must offer either pre-disaster or post-disaster fair market value.[23] All such buyouts are voluntary and require a willing seller. Buyouts advance climate change adaptation by allowing communities to demolish acquired buildings and revert the land to open space for public benefit in perpetuity. Future development is often restricted through deed restrictions or conservation easements, and the property is usually owned and maintained by the government, a non-profit, or a land trust.[24] Today, buyouts are most typically carried out on a parcel-by-parcel basis, but they can also be used to buyout an entire community, as seen in Isle de Jean Charles, Louisiana.[25] Because of the complex, multi-jurisdictional nature of property buyouts, the entire process tends to take between 18 and 36 months.[26]

[21] Siders, A. R. (2019). "Social Justice Implications of US Managed Retreat Buyout Programs." *Climatic Change*.
[22] IBID.
[23] IBID.
[24] Georgetown Climate Center. (n.d.) "Managed Retreat Toolkit."
[25] IBID
[26] Siders, A. R. (2019). "Social Justice Implications of US Managed Retreat Buyout Programs." *Climatic Change*.

Other Acquisition Tools

While federally funded property buyouts are the most recognized tool to facilitate relocation, there other acquisitions tools available to communities interested in planned relocation. Open space acquisitions use fee simple titles, easements, or covenant agreements to voluntarily acquire privately owned land for open space or recreation and can be used to support retreat by protecting migration corridors for coastal ecosystems.[27] Conservation land trusts are non-profits that acquire and hold land for public benefit and are another channel to acquire land with high ecological value in flood prone areas.

More innovative solutions, such as land swaps, leasebacks, and life estates, are starting to be applied in the relocation context across the country. In land swaps, two or more property owners exchange the titles to their land in perpetuity. If used to swap ownership between coastal residential properties and more inland open space, this technique can facilitate residential retreat while creating a barrier of open space closer to the coast.[28] Leasebacks are when a government buys an at-risk property and leases it back to the original owner, giving property owners additional time to purchase a new home. California legislature attempted to pass a bill that would allow a low-interest loan fund to be used by coastal municipalities for this purpose, but it was vetoed by Governor Newsom in 2021.[29] If leasebacks are executed with purchase values and lease rates that enable residents to afford buying a home in a new location, they offer a promising alternative to buyouts. Finally, under life estates, governments reach an agreement with property owners that they will transfer the property to the government once they die. An alternative to this approach is making an agreement to transfer the land once the high tide line rises to a certain

[27] Georgetown Climate Center. (n.d.) "Managed Retreat Toolkit."
[28] IBID.
[29] Mulkern, Anne C. (2021). "For Rent: California Houses Endangered by Rising Seas." *ClimateWire.*

level, or some other natural trigger event.[30] While these property transfer tools show promise in facilitating a gradual retreat from at-risk areas, practitioners must consider the impacts to families' intergenerational wealth, especially given the stark racial wealth gap that exists in the United States. Proper compensation will likely be necessary to avoid perpetuating wealth gaps.

Regulatory Tools

While acquisition tools can be an effective way to relocate the most vulnerable buildings and encourage open space preservation, regulatory tools can also be employed to restrict development in at-risk areas or to gradually incentivize relocation. Setbacks and buffers establish required distances that structure must be located behind a tidal line or other natural features to keep development away from flooding hazards.[31] Most localities have development setbacks already, but they could be used to support planned relocation by being updated to reflect sea level rise projections. Zoning and overlay zones can also be used to gradually encourage relocation. For example, a coastal overlay zone could phase out development in vulnerable coastal areas or could require relocation of existing structures after certain trigger events, such as a high tide reaching a certain point or a certain amount of flood damage.[32] Zoning can also be an effective tool for preparing inland areas for an influx of residents by allowing increased density or protecting inland habitat.

Community Planning

While buyouts and regulatory tools can be implemented as standalone actions, they can also be integrated into comprehensive, community-wide planning efforts. Places that are at especially high risk from climate hazards may come together to plan for relocation of the entire

[30] Georgetown Climate Center. (n.d.) "Managed Retreat Toolkit."
[31] IBID.
[32] IBID.

community. For example, in 2016, Isle de Jean Charles—a narrow island in the bayous of Louisiana—received $92.6 million from Obama's National Disaster Resilience Competition to relocate the entire community to higher ground.[33] Newtok—a village of 350 members of the Yupik tribe in Western Alaska that is threatened by rising seas and melting permafrost—has been exploring relocation options for decades. In 1996, the community voted to relocate, but acquiring funding, buying land to move to, and receiving sufficient federal support has been a drawn-out process that didn't result in the first resident moving until 2019.[34]

Full community relocation planning is one end of the spectrum, but a wide range of community planning processes can incorporate planned relocation. For example, hazard mitigation plans, climate vulnerability assessments, climate action plans, coastal management plans, and local comprehensive plans can all serve as means to evaluate risks, engage the public, weigh solutions, and propose solutions (which could include relocation). Other more specific plans, such as post-disaster recovery plans, wetland migration plans, or long-range transportation plans, could also consider relocation as one of many solutions for a community. A benefit of incorporating planned relocation into long-term community planning processes is that it opens the door for deep community engagement and supports the phasing of actions over time to ensure all necessary policy and regulation is in place before relocation occurs.[35] The forward-looking approach to such planning processes may also help place relocation on more even footing with protection and accommodation strategies given that people may be more willing to consider relocation if it is over a 10- or 20-year timescale than a 1-year timescale.[36]

---

[33] Bagri, Neha Thirani. (2017). "The US is Relocating an Entire Town Because of Climate Change. And This is Just the Beginning." *Quartz*.
[34] "Newtok Planning Group." (2019). Alaska.gov. Department of Commerce, Community, and Economic Development.
[35] Georgetown Climate Center. (n.d.) "Managed Retreat Toolkit."
[36] IBID.

Market-based Tools

In addition to acquisition, regulatory, and planning tools, there are also market-based solutions that can be used to support or encourage relocation as an adaptation strategy. Transfer of Development Rights (TDR) or tax credits can be used to create incentives to shift development from at-risk areas.[37] Under TDR, administrators of the program define "sending areas" where development is discouraged, and preferred "receiving areas." Property owners in "sending areas" can then choose to sell unused development rights as "credits" if they agree to preserve their land with a conservation easement rather than develop it. These credits can be sold to developers in receiving areas, allowing them to increase the density of their proposed development. In this way, TDR creates a market-based system through which to trade the rights to develop. Such a system supports relocation not only by discouraging development in at risk areas, but also increasing options for people and infrastructure to relocate to by allowing increased density in preferred areas. Especially if paired with provisions to reserve affordable units for those moving away from at-risk areas, TDR could be a powerful mechanism to allow people to relocate to areas in close proximity to their original homes.

Challenges with Planned Relocation

While planned relocation offers a powerful, long-term adaptation solution to climate change, it is fraught with challenges that make it both controversial and difficult to implement well. These barriers can be overcome, but a thorough examination of challenges is necessary before exploring emerging best practices and solutions. This section presents psychological, emotional, cultural, political, institutional, financial, and legal barriers to planned relocation,

[37] Georgetown Climate Center. (n.d.) "Managed Retreat Toolkit."

concluding with a final section about additional equity concerns not captured in the other categories. First, I will present an equity framework through which to interpret the challenges. The framework is adapted from Idowu Jola Ajibade and A.R. Sider's book *Global Views on Climate Relocation and Social Justice.* The authors ask three primary questions about justice within planned relocation processes: (1) Who is most at risk from which climate hazards and why? (2) Who has access to resources to adapt in place or to relocate? (3) Who has the political or economic power to determine whether they stay or leave? We will see aspects of all of these questions emerge in the following discussion of planned relocation challenges.

While this paper uses the terms "equity" and "justice" interchangeably, it is important to define what those terms mean in the context of planned relocation. Ajibade and Siders present five types of justice that are especially relevant to the discussion. The first is Environmental Justice, which includes the formal participation of affected communities in decision-making (procedural) and avoiding an uneven distribution of the benefits and harms caused by relocation (distributive). Social Justice focuses on the fair allocation of resources and goods, including affordable housing, access to employment and healthcare, and wealth. Ecological Justice requires the consideration of ecosystems and non-human species in decision-making. Recognition Justice acknowledges the historic wrongs that shape the current conditions and experiences of those involved in or affected by relocation. Finally, Restorative Justice takes one step further and calls for tackling additional societal ills while pursuing relocation by ameliorating, not perpetuating, those historic wrongs. Speaking to the critical need of considering equity in relocation planning, Ajibade and Siders write: "While some planned retreat programs empower and benefit individuals and communities, others ignore people's rights, entrench inequities, and perpetuate risk, vulnerability, and harm already marginalized communities and groups. This lack of

attention to equity and justice can undermine the potential of planned retreat as a viable adaptation strategy."[38] As such, the discussion below presents a broad look at challenges associated with planned relocation, while drawing careful attention to equity and justice implications throughout. A summary of the barriers examined in this section are outline in the table below.

Category	Barriers Addressed
Psychological, Emotional, and Cultural	• Language choice and communication barriers • Skewed risk perceptions and optimism bias • Emotional and cultural connection to place • Outcome uncertainty
Political and Institutional	• Lack of overarching governmental support • Difficulty of integrating with other societal goals • Mismatches between incentive to and authority to pursue relocation • Reactive and drawn-out buyout processes
Financial	• Obscured risks from subsidized flood insurance • Sheer cost of buyouts • Limited agency for low-income residents due to financial constraints • Disparities between financial outcomes for remaining and receiving communities
Legal	• Navigating laws and regulations across multiple jurisdictions • Vulnerability to takings and negligence claims
Additional Equity Concerns	• Racial and economic disparities of those most at risk from flood risks • Overlooked constraints for Indigenous People • Devaluation of frontline knowledge and experience • Overvaluation of assets with measurable monetary value • Lack of consideration for the needs of non-homeowners

[38] Ajibade, I. J., & Siders, A. R. (2021). *Global Views on Climate Relocation and Social Justice* (1st ed.). Routledge.

Psychological, Emotional, and Cultural

Starting a conversation with someone about relocation or even thinking about the prospect of relocating yourself, it is likely that psychological or emotional conflicts will be the most immediate barriers. Simply the language commonly used to talk about planned relocation is enough to make people shut down and dismiss it outright. Especially the term "managed retreat" has been shown to turn people off as it connotes failure or a last resort and strikes people as very top-down, seemingly stripping people of their agency.[39] "Retreat" and some of the other words associated with coastal adaptation—"armoring," "coastal hardening," and "coastal defense"—have militaristic connotations that creates a negative narrative for some.[40] Particularly for Tribal Nations, the militaristic language runs counter to their approach to coastal adaptation that prioritizes the environment and ecosystems over human use.[41] Regardless of the language used, confronting the implications of the climate crisis is uncomfortable and something that most people are not practiced in. Despite the fact that 70% of Americans believe global warming is happening, only 33% report talking about it with friends or family.[42] This is in part because of the politicization of climate change in America, which creates a barrier to entering into discussions about climate change adaptation strategies, including planned relocation.

In addition to communication barriers, planned relocation discussions are hindered by differing perceptions of risk.[43] People tend to underestimate risk and overestimate the

[39] Climigration Network. (2021). "Lead with Listening: A Guidebook for Community Conversations on Climate Migration."
[40] IBID.
[41] Leonard, K. (2021). "WAMPUM Adaptation Framework: Eastern Coastal Tribal Nations and Sea Level Rise Impacts on Water Security." *Climate and Development*.
[42] Leiserowitz, Anthony, et al. (2021). "Climate Change in the American Mind." Yale Project on Climate Change Communication, George Mason University's Center for Climate Change Communication.
[43] Siders, A.R. & Hino, Miyuki & Mach, Katharine. (2019). "The Case for Strategic and Managed Climate Retreat." *Science*.

effectiveness of protective barriers.[44] Lax real estate rules and outdated flood maps that do not incorporate climate change projections also add to inaccurate risk assessments. Individuals with strong attachment to place are especially susceptible to optimism bias, which allows them to believe that sea level rise is happening but that it will not affect them personally or the government or new technology will address the issue before they need to act.[45] Even personal experience with flooding is quickly forgotten to eliminate cognitive dissonance with their desire to remain in their home. The prevalence of optimism bias is demonstrated in the fact that 65% of Americans think that people in the U.S. will be harmed by global warming, but only 45% believe they will be harmed themselves. This disconnect contributes to a false sense of security that makes many people assume that considering relocation is not necessary. This is compounded by the fact that planned relocation requires addressing difficult tradeoffs between economic efficiency, human security, environmental preservation, and cultural values—decisions that feel daunting to entertain. The combination of complex psychological factors at play in planned relocation convinces most people to remain in place and hope for the best.

Emotion and culture also play a central role in shaping how individuals think, feel, and respond to planned relocation discussions or proposals. First and foremost, people tend to have strong emotional attachments to where they live, shaping their personal identity and influencing their decision-making.[46] This attachment can stem from the simple enjoyment of living near the coast, or by the proximity to employment, essential services, cultural sites, or a close-knit community. This attachment to place tends to be especially strong for Indigenous peoples, whose identity is closely tied to the land and whose proximity to sacred burial grounds is especially

[44] A.R. Siders. (2019). "Managed Retreat in the United States." *One Earth*.
[45] IBID.
[46] IBID.

important.[47] Considering relocating isn't simply about the cost or logistics, but potential loss of identity, history, and community. Especially when relocation is pursued on an individual basis, it can lead to the splintering of communities, which can cause serious mental health issues. Research shows that the elderly and minority populations are especially vulnerable when relocated away from their social support systems.[48]

Beyond the threats to identity, culture, and community, contemplating relocation can induce fear given the many uncertainties around outcomes for those who relocate. Researchers have cited a sizable gap in research when it comes to the outcomes of those who have been relocated. Even though FEMA has bought out over 40,000 properties, planned relocation still feels like a relatively new concept with little practical guidance for local governments or individuals,[49] adding to a sense of fear and uncertainty. Despite the weight of the emotional and cultural barriers to relocation, planned relocation to date has focused much more on people and infrastructure than social, cultural, or psychological consequences.

Political and Institutional

Political and institutional structures have created a mismatch between incentives and the authority to act that makes it challenging to execute relocation in efficient and equitable ways. We will look first at the political and institutional structures (or lack thereof) that contribute to challenges to implementing planned relocation. First, there is simply a lack of governmental agencies and policies to facilitate relocation at a large scale.[50] While property buyout funding is available through FEMA and HUD, there is no dedicated federal funding for relocation support

[47] Leonard, K. (2021). "WAMPUM Adaptation Framework: Eastern Coastal Tribal Nations and Sea Level Rise Impacts on Water Security." *Climate and Development*.
[48] Siders, A. R. (2019). "Social Justice Implications of US Managed Retreat Buyout Programs." *Climatic Change*.
[49] A.R. Siders. (2019). "Managed Retreat in the United States." *One Earth*.
[50] Bronen, Rachel. (2010). "Forced Migration of Alaskan Indigenous Communities Due to Climate Change." University of Alaska, Resilience and Adaptation Program.

and no lead agency tasked with providing relocation support and coordinating other agencies—an issue that has been particularly acute for entire communities that are attempting to relocate, such as Newtok, Alaska.

This lack of federal guidance and support is especially problematic given the many stakeholders involved in any relocation effort. Careful coordination is needed to balance the complex and varied motivations and needs of households, government agencies at multiple scales, civic organizations, and the private sector.[51] Without a coordinating body, power dynamics between stakeholders are more likely to affect group decision-making, leaving marginalized populations with the least say in the outcome. Despite the complexity of the issue at hand, little research or guidance is available for practitioners considering relocation plans.[52] Ultimately, the lack of structure and guidance makes it difficult for communities and individuals to navigate the relocation process. This challenge will be felt most acutely by communities and tribes without adequate financial or human resources to invest in additional support. This will increase the chance that relocation is pursued in an ad hoc manner that cannot guarantee equitable outcomes.

As a result of the patchwork institutional framework described above, planned relocation runs the risk of happening in a silo without coordination or integration with other community goals or initiatives. As pointed out by Marla Nelson of the University of New Orleans' Department of Planning and Urban Studies, relocation runs counter to community redevelopment goals.[53] If pursued without department and agency coordination, such a barrier may lead to a standstill. Another issue is that retreat, in the form of buyouts, is funded and implemented in

---

[51] Ajibade, I. J., & Siders, A. R. (2021). *Global Views on Climate Relocation and Social Justice* (1st ed.). Routledge.
[52] Siders, A. R. (2019). "Social Justice Implications of US Managed Retreat Buyout Programs." *Climatic Change*.
[53] French, Kristen. (2021). "What is needed for Fair and Equitable Managed Retreat?" Columbia Climate School.

isolation from decisions about coastal armoring and other adaptation techniques. This separation can lead to unwise and inefficient investments, such as rebuilding sea walls in areas about to be abandoned.[54] The disconnect between relocation planning and other community goals can also lead to missed opportunities to deliver benefits to the community. For example, if abandoned land is not repurposed into, say, publicly accessible open space, it can result in patches of derelict land that lowers land values and sense of place for those who remain.[55]

Another structural barrier to efficient and equitable relocation is the widespread mismatch between which people or governing bodies have the authority to act versus those that have the incentive to act. Perhaps the strongest example of this mismatch stems from the role of the federal government in disaster recovery. Through unsustainably costly flood insurance policies and disaster recovery funding, the federal government bears the brunt of the cost when people choose to remain in at-risk areas. However, the federal government has little to no authority to regulate local land use decisions that would reduce damages.[56] Because individuals, cities, and states can rely on federal recovery funds, they have a much smaller incentive to move or enact policy that would encourage relocation away from at-risk areas. An example from Dauphin Island, Alabama illustrates the extent to which this incentive and authority mismatch leads to an unbalanced and inefficient use of federal dollars. Since 1988, residents on Dauphin Island have paid $9.3 million in insurance premiums but have received $72 million in insurance claims and $80 million in disaster recovery funds.[57] By funding recovery from disasters it has no authority to mitigate, the federal government is essentially paying residents to remain in areas

[54] Siders, A.R. & Hino, Miyuki & Mach, Katharine. (2019). "The Case for Strategic and Managed Climate Retreat." *Science*.
[55] IBID.
[56] A.R. Siders. (2019). "Managed Retreat in the United States." *One Earth*.
[57] IBID.

where their properties and lives are at risk. Local governments have little incentive to intervene in the cycle.

An equally troubling mismatch between authority and incentives exists between municipalities and individuals in the property buyout process. As will be described in greater depth in the following section, municipalities often have a financial incentive to not pursue buyouts because people moving outside of their borders will deplete the tax base. However, it is state and local governments that have authority to apply for buyout funding on behalf of individuals. As a result, individuals experiencing repeated damages from flooding may want to move but are at the mercy of their municipality to request buyout funding. This issue came into play on Staten Island after Hurricane Sandy in 2012: residents of Oakwood Beach requested buyouts from New York City, but the City refused their request.[58] They were eventually able to relocate after residents convinced the state government to apply for funding on their behalf instead. These mismatches in authority and incentives have social justice implications as well—if government structures, as a baseline, are not set up in a way that incentivizes protection of at-risk areas, how can we expect the same structures to consider and prioritize the needs of the most marginalized people?

The final political and institutional barriers I will examine all stem from timing of relocation efforts. First, because much of the available funding for buyouts becomes available only after a major disaster, relocation ends up being driven largely by disasters.[59] This reactive, rather than proactive, approach greatly reduces the capacity for in-depth, meaningful engagement

[58] A.R. Siders. (2019). "Managed Retreat in the United States." *One Earth*.
[59] Siders, A.R. & Hino, Miyuki & Mach, Katharine. (2019). "The Case for Strategic and Managed Climate Retreat." *Science.*

that has been shown to build trust and lead to more equitable outcomes.[60] Even though these processes are currently tied to disaster recovery—indicating urgency of action—, FEMA buyout processes are notoriously long, often taking one to three years to complete.[61] Not only does relocation currently happen only *after* disaster has struck, but it also tends to be an incredibly drawn-out process, subjecting individuals to major life disruption. On the more political side, whether or not governments offer buyouts is often shaped by politicians' reelection goals.[62] As mentioned, good planning requires long engagement periods that builds trust. Confining such a process to political election cycles greatly limits the potential for community-led, or even community-guided, relocation planning efforts.

Financial

Just as there is misalignment between incentives for action and authority to act on planned relocation, there exists a misalignment of financial incentives to act. First, the National Flood Insurance Program (NFIP), which offers primary flood insurance to properties with significant flood risk and requires floodplain management standards, is heavily subsidized.[63] Federally subsidized insurance rates and disaster recover costs means that property owners do not bear the true costs of flood damage. While this has great benefits in that it protects property owners from financial devastation, it means that coastal development is not financially disincentivized appropriately. Developers can make short-term financial gains by building valuable coastal properties without having to pay the long-term consequences of damages and costly adaptation measures.[64] These conditions brought on by heavily subsidized flood insurance

[60] Climigration Network. (2021). "Lead with Listening: A Guidebook for Community Conversations on Climate Migration."
[61] Siders, A. R. (2019). "Social Justice Implications of US Managed Retreat Buyout Programs." *Climatic Change*.
[62] IBID.
[63] "Introduction to the National Flood Insurance Program (NFIP)." (2021). Congressional Research Service.
[64] A.R. Siders. (2019). "Managed Retreat in the United States." *One Earth*.

may be beginning to change. In October 2021, FEMA began its transition to Risk Rating 2.0—a new risk assessment and pricing methodology that incorporates far more flooding variables and intends to more equitably distribute costs and incentivize relocation.[65] Flood insurance rates are projected to skyrocket, especially for large coastal homes. The implications for low-income residents have yet to be seen.

On top of misaligned financial incentives, the sheer cost of relocation cannot be overlooked. Eric Letvin, FEMA's director of hazard mitigation and risk reduction policy estimates that, over the last 40 years, FEMA has spent $3.4 billion on around 48,000 buyouts in the United States.[66] Despite the high cost, it represents only a tiny fraction of the 14.6 million properties currently located in the 100-year flood zone.[67] For this reason, many experts such as A.R. Siders, argue that buyouts are simply too expensive to employ at the necessary scale while providing adequate support for those relocating.[68] Of course, there are other approaches to relocation than just buyouts, but because buyouts are currently the most easily tracked strategy, it provides an idea of the scale of the costs associated with relocation. While relocation is costly, it is important to note the extent to which proactive adaptation strategies, such as relocation, are less expensive than inaction. The Global Commission on Adaptation found that a $1.8 trillion investment in resilience measures over the next ten years globally would return $7.1 trillion in net benefits.[69] While the cost of adaptation is high, the payoff is higher.

---

[65] Flavelle, Christopher. (2021). "The Cost of Insuring Expensive Waterfront Homes Is About to Skyrocket." The New York Times.
[66] Gout, Elise. (2021). "Are Buyouts a Viable Tool for Climate Adaptation?" Columbia Climate School.
[67] IBID.
[68] Siders, A.R. & Hino, Miyuki & Mach, Katharine. (2019). "The Case for Strategic and Managed Climate Retreat." *Science*.
[69] "Investing in Resilience." (2019). Center for Climate and Energy Solutions.

What about the costs of relocation to individuals? Considering financial effects on individuals is especially critical when considering equity implications. For some, relocation may offer a promising way out of a risky situation, but it can also disconnect people from their livelihoods, worsening poverty and food insecurity.[70] As such, special consideration needs to be paid to how financial factors influence the outcomes of relocation for low-income populations. Consider a low-income homeowner suffering from repetitive flood damage. The at-risk nature of where they live and the damage to the community causes a sharp reduction of their property value. Such a resident might find themselves stuck in a highly at-risk place, unable to relocate because their largest asset—their home—has suddenly dropped significantly in value. While financial limitations may prevent some low-income residents from relocating, financial strain may also unfairly force low-income residents to relocate while wealthier residents can stay in place. Low-value homes are more likely to be deemed "substantially damaged" and eligible for buyouts,[71] so if a low-income resident is stuck between accepting a buyout or facing insurance premiums and rebuilding costs they can't afford, they may be forced into relocation by financial constraints.[72] While most buyout programs offer the pre-disaster value of the home, even this value may not be sufficient to buy a home in a safer neighborhood. A further discussion of the adequacy of buyout compensation and the relevant Uniform Relocation Act is included below in the "Additional Equity Considerations" section.

Financial implications for communities on both sides of the relocation coin (those receiving newcomers and those left behind) also present challenges for facilitating equitable

---

[70] Ajibade, I. J., & Siders, A. R. (2021). *Global Views on Climate Relocation and Social Justice* (1st ed.). Routledge.
[71] Siders, A. R. (2019). "Social Justice Implications of US Managed Retreat Buyout Programs." *Climatic Change*.
[72] Siders, A.R. & Hino, Miyuki & Mach, Katharine. (2019). "The Case for Strategic and Managed Climate Retreat." *Science*.

planned relocation. First, communities experiencing an exodus of residents face a serious drain on their tax base. Small, rural towns are particularly at risk. After Hurricane Matthew submerged Fair Bluff, North Carolina under four feet of water and flooded nearly a quarter of the town's homes, the population of around 1,000 fell by nearly half.[73] The town is now struggling to fund basic services. While buyouts can help individuals avoid risk, it can lead to financial devastation of the places they leave behind if not planned for appropriately. On the flip side, an influx of new residents into a receiving community can place stress on housing markets, social services, health care, and infrastructure.[74] Across the board, the change in economic and transportation demands as a result of relocation is something that will have financial ramifications for communities and must be taken into account.

Legal

While many of the barriers presented up to this point focus on simply considering or planning for relocation, there are significant legal considerations that can complicate governments' commitment and ability to follow through on relocation. First, because relocation requires multi-jurisdictional planning, state and local governments must ensure that they have the legal authority to implement different tools. Especially in Dillon Rule states where local governments can only exercise the powers expressly granted to them by the state, municipalities need to ensure they remain compliant under state laws.[75] Because there are so many local, state, and federal regulations and regulatory bodies involved in relocation planning, lawyers are typically needed to manage largescale relocation projects. Just to give a few examples of required compliance, the U.S. Army Corps of Engineers regulates activity in intertidal zones

[73] Favelle, Christopher. (2021). "Climate Change is Bankrupting America's Small Towns." The New York Times.
[74] Climigration Network. (2021). "Lead with Listening: A Guidebook for Community Conversations on Climate Migration."
[75] Georgetown Climate Center. (n.d.) "Managed Retreat Toolkit."

under the Clean Water Act and Rivers and Harbors Act; municipalities and states often both have their own wetland protection regulations; and many states have special protections for coastal areas under the Coastal Zone Management Act.[76] Navigating all of these various regulations can be a legal headache that creates a barrier for governments to implement relocation strategies.

Additionally, governments that pursue relocation may find themselves vulnerable to takings and negligence claims. Takings are typically defined as a government taking private property without just compensation. While this is not a common issue in voluntary buyout negotiations, taking claims can also be issued over infrastructure disinvestment that leads to decreasing property values, for example.[77] Similarly, because retreat may involve the intentional disinvestment in certain public infrastructure, citizens could potentially make negligence claims, arguing that the government is not meeting its "duty to maintain" public goods.[78] Fear over coming up against such legal challenges may dissuade governments from exploring the strategy.

Additional Equity Concerns

All of the barriers discussed to this point have equity implications for relocation planning and outcomes, but a more explicit look at social justice and equity within the context of planned relocation is needed to paint the full picture. Because systems of oppression and inequality are so deeply entrenched in the United States' governmental, economic, and social structures, recognition justice and restorative justice are needed not only to eliminate harm to marginalized people, but also to intentionally bring benefits. Hardy et al. caution against "colorblind adaptation planning" that "perpetuates what Rob Nixon calls the "slow violence" of environmental racism, characterized by policies that benefit some populations while abandoning

[76] Georgetown Climate Center. (n.d.) "Managed Retreat Toolkit."
[77] IBID.
[78] IBID.

others."[79] Adaptation planning that overlooks racial inequality—or attributes racial disparities to non-racial causes—can only perpetuate existing systems of oppression.[80] Two of the biggest equity issues in the context of sea level rise adaptation and relocation are disparities in who is at risk and who adaptation plans are designed to benefit.

There are countless compounding effects that cause marginalized people to be more at risk from sea level rise and other climate hazards. Historic housing injustices, including redlining, racial covenants, and urban renewal policies, have resulted in racial minorities—particularly black Americans—living in some of the least desirable neighborhoods. Property valuation patterns have caused areas at high risk from natural hazards to be more affordable, causing low-income residents to disproportionately live in risky places. A study by Martinich et al. showed that 99% of the most socially vulnerable people in the Gulf Coast live in areas unlikely to be protected from inundation by government programs, compared to just 8% of the least socially vulnerable.[81] Gentrification is only worsening this trend, as wealthy residents relocate to safe places previously occupied by low-income residents, worsening the poor's outcomes or displacing them to riskier areas.[82]

Tribal nations are also uniquely affected by sea level rise. Most northeast and mid-Atlantic tribes reside within Low Elevation Coastal Zones.[83] On top of that, colonization confined Indigenous Peoples to reservations, vastly limiting their ability to relocate to areas with the same level of cultural significance. As Indigenous populations grow—and the size of their

---

[79] Hardy, R. D., Milligan, R. A., & Heynen, N. (2017). "Racial Coastal Formation: The Environmental Injustice of Colorblind Adaptation Planning for Sea-Level Rise." Geoforum; Journal of Physical, Human, and Regional Geosciences.
[80] IBID.
[81] Siders, A. R. (2019). "Social Justice Implications of US Managed Retreat Buyout Programs." *Climatic Change*.
[82] IBID.
[83] Leonard, K. (2021). "WAMPUM Adaptation Framework: Eastern Coastal Tribal Nations and Sea Level Rise Impacts on Water Security." *Climate and Development*.

reservations stay the same[84]—they face increasing density pressures, which may make the need for relocation more acute and more difficult to implement. Due to the unique constraints and governance structures of Tribal Nations, adaptation planning that does not explicitly plan for their needs will leave them overlooked, perpetuating the centuries of harm inflicted by the United States government.

Relocation planning and other adaptation approaches run the risk of perpetuating injustice based on the systems in which the plans are created and who the plans are intended to protect. For example, the dominant governmental planning processes favor scientific data that is considered to be objective. They also typically run on tight budgets and timelines. As a result, expertise from people on the frontline of risk is often excluded, either because it is not valued appropriately or there is not time in the planning process to build the relationships and trust to gather that expertise.[85] Similarly, Indigenous knowledge and experience is often excluded. Federal institutions, such as FEMA, NOAA, and USACE, do not incorporate Indigenous knowledge, and a survey showed that state climate change studies in Connecticut, Delaware, Maine, Massachusetts, Maryland, New Jersey, New Hampshire, New York, Pennsylvania, Rhode Island, and Virginia have little to no mention of Indigenous Peoples or their experiences, and fail to draw from their deep knowledge of the land.[86]

The capitalistic society in which relocation planning takes place tends to overvalue assets with measurable monetary value, such as housing and infrastructure, and undervalue assets that cannot be easily monetized, such as ecosystems and culture. A study by A.R. Siders exploring

---

[84] Leonard, K. (2021). "WAMPUM Adaptation Framework: Eastern Coastal Tribal Nations and Sea Level Rise Impacts on Water Security." *Climate and Development*.
[85] Climigration Network. (2021). "Lead with Listening: A Guidebook for Community Conversations on Climate Migration."
[86] Leonard, K. (2021). "WAMPUM Adaptation Framework: Eastern Coastal Tribal Nations and Sea Level Rise Impacts on Water Security." *Climate and Development*, *13*(9), 842–851.

the criteria used by governments to offer buyouts reveals the social inequity that can result from cost benefit analyses (CBA) that depend on such monetary valuations. She provides the example of Cedar Rapids, Iowa where a CBA was used to evaluate a proposal to build a levee to protect a low-value residential area. The proposal was rejected because the monetary value of the homes protected was not enough to justify the cost of the levee.[87] Cultural significance and attachment to place were not considered. This example illustrates the way in which seemingly "objective" CBAs tend to favor protection of high-value, high-density areas, and retreat from low-value, low-density areas.[88] Using traditional decision-making tools and knowledge streams to plan for coastal adaptation—without deliberate efforts to offset historic oppression—will result in the continuation or worsening of existing social inequalities and vulnerabilities. These effects may be felt through cultural erasure, weakening of critical social connections, or a loss of access to economic opportunity.

Relocation planning also runs the risk of overlooking populations with less economic and political power. For example, renters, mobile homeowners, and those living in informal settlements or with insecure land tenure are routinely left out of public engagement processes and not accounted for in the plans.[89] Work by Deborah Morris has shown the extent to which renters are routinely overlooked or face worse relocation outcomes than homeowners. While there is a federal statute called the Uniform Relocation Act of 1970 that requires that federal buyout programs reimburse tenants for moving expenses and pay any difference in rent for 42 months, Morris noted that this statute was not well-enforced in New York City after Hurricane

[87] Siders, A. R. (2019). "Social Justice Implications of US Managed Retreat Buyout Programs." Climatic Change.
[88] IBID.
[89] Siders, A.R. & Hino, Miyuki & Mach, Katharine. (2019). "The Case for Strategic and Managed Climate Retreat." *Science.*

Sandy.[90] Landlords are all too often reluctant to accept rent vouchers from such a program.[91] Especially in cities with housing shortages, it can be incredibly difficult to develop new affordable housing units, leaving displaced, low-income renters with few housing options after relocation.

Gender and immigration status may also come into play. If women are more confined to domestic duties or living in a household dominated by male decision-makers, they may be overlooked in decision making and excluded from negotiations.[92] Gendered income disparities may also limit the ability of some women to move to a safer location. If a family has limited English language proficiency, it will be far more difficult to access information about buyout programs and weed through the bureaucratic steps. After Hurricane Sandy, officials managing a buyout program on Staten Island noted that the era of anti-immigration policy in the United States likely contributed to a fear of signing government documents for recent or undocumented immigrants.[93] Such factors must be carefully considered when designing relocation programs.

Best Practices for Equitable Planned Relocation

While the previous section outlined a myriad of barriers to implementing strategic and equitable relocation, there is also a growing body of literature addressing ways to overcome these barriers. Pulled from peer-reviewed articles and practitioner guidance documents, the following best practices provide a non-comprehensive set of recommendations to improve outcomes of planned relocation, primarily from an equity standpoint. Recommendations include

[90] Morris, Deborah Helaine (2021). "The Climate Crisis is a Housing Crisis: Without Growth We Cannot Retreat."
[91] IBID.
[92] Ajibade, I. J., & Siders, A. R. (2021). *Global Views on Climate Relocation and Social Justice* (1st ed.). Routledge.
[93] Isacoff, Rachel (2021). "Identity and Power: How Cultural Values Inform Decision-Making in Climate-based Relocation."

acknowledging and reversing historic injustices, facilitating community-led planning processes, creating authentic opportunities for choice, integrating relocation into planning for a range of other societal goals, ensuring emotionally and culturally sensitive community engagement approaches, and striving for creativity and innovation throughout the process.

Acknowledge and Reverse Historic Injustices

As discussed above, historic injustices such as colonization, redlining, and urban renewal projects have resulted in people of color and low-income residents bearing the brunt of many environmental risks, including flood hazards. As such, planned relocation programs must explicitly prioritize the outcomes of these frontline communities with reparative action. Programs that fail to recognize and address the historic systems and policies that have placed certain populations at risk will only perpetuate patterns of housing insecurity, environmental injustices, and economic disparities.[94]

Doing this requires moving beyond the traditional white-centered frameworks and decision-making tools that reinforce existing power dynamics while ignoring the nuanced needs and desires of different communities.[95] As Rachel Isacoff (2021) aptly points out, planning decisions are always shaped by culture and values, and governments and planners are traditionally swayed by "rational" or financial analysis; whereas frontline communities are more likely to be driven by group identity, self-determination, and protecting their livelihoods and culture. If tools like cost-benefit analysis are to be central to decision-making processes, they must assign more weight to actions that reduce social vulnerability and prioritize favorable outcomes, as defined by frontline communities. Only through a transparent and collaborative

[94] Morris, Deborah Helaine (2021). "The Climate Crisis is a Housing Crisis: Without Growth We Cannot Retreat."
[95] Isacoff, Rachel (2021). "Identity and Power: How Cultural Values Inform Decision-Making in Climate-based Relocation."

process for developing decision-making tools can intangibles like loss of culture, weakened social cohesion, and diminished sense of place be weighed against resilience and economic benefits of relocation. The difficult truth is that tradeoffs will ultimately have to be made between values. However, by acknowledging that the oppressive structures that placed frontline communities in harm's way are still operating today, practitioners can take steps to lift up the needs and priorities of those who have been wronged in the past.

An essential step in reversing historic injustices through relocation projects is for practitioners to critically examine their own positionality and adopt a self-reflexive practice. Going into community engagement processes about planned relocation, planners can ask themselves what assumptions they are making about the community, what reasons residents might have to distrust someone in their position, and how they may be perceived as contributing to the problem.[96] A self-reflexive practice will not only force practitioners to explicitly consider the impact of past injustices but will also support trust building with the community.

Facilitate Community-Led Planning Processes

Perhaps the most widely recommended way to ensure planned relocation creates equitable outcomes for all is to make it a community-led process. Ultimately, this requires practitioners stepping back from decision-making roles and creating space for communities to determine the outcomes of the process. This is not to say that governments and planners do not have a role in managing relocation. They do—but as facilitators and supporters of a community-driven process. Stepping into a supporting role can be difficult especially if the community is distrustful of government officials and processes. Partnering with trusted community leaders and deliberately building trust in ways that are specific to the community—whether that is through

[96] Climigration Network. (2021). "Lead with Listening: A Guidebook for Community Conversations on Climate Migration."

food, ritual, data sharing, or something else—is a key step.[97] Demonstrating a clear intention to prioritize community self-determination will improve trust in governments and limit conflict as the process unfolds.[98]

A critique of community-led processes is that they are too time intensive and do not fit in the confines of project timelines, election cycles, or the natural timelines set by climate threats. An African saying shared by Dr. Bayo Akamolafe and included in a guidebook for having community conversations about climate migration addresses this tension nicely: "Times are urgent: let us slow down."[99] As counterintuitive as this may sound, the complexity and scale of the issue demands slowing down if it is to be done right. Slowing down allows time for communities to think deeply about the choices they face and arrive at a place where they can more objectively weigh the benefits of relocation with the costs of leaving behind their homes. Slowing down creates time to think of new solutions instead of defaulting to the existing pathways to relocation that are perpetuating inequality.

Most of all, slowing down opens the door to building trust between government officials and communities and using local knowledge to inform decision-making. Most commonly, risk assessments and relocation planning processes are performed by consulting firms in offices far removed from the community they are working with. While these firms may set out to seek community input and advance local goals, they lack the time to really understand the local context, forcing them to work from a vague set of values that may not capture local priorities.[100]

---

[97] Climigration Network. (2021). "Lead with Listening: A Guidebook for Community Conversations on Climate Migration."
[98] Isacoff, Rachel (2021). "Identity and Power: How Cultural Values Inform Decision-Making in Climate-based Relocation."
[99] Climigration Network. (2021). "Lead with Listening: A Guidebook for Community Conversations on Climate Migration."
[100] Isacoff, Rachel (2021). "Identity and Power: How Cultural Values Inform Decision-Making in Climate-based Relocation."

If the process is community-led and given enough time, leaders can lift up frontline, local, and indigenous knowledge and lived experience and combine it with technical expertise to create a far more robust understanding of risk. A process led by members of the community has a much better chance of assessing the needs of all residents than one led by an outsider without established relationships with local networks.

Finally, relocation discussions and planning processes that are driven by the community are better able to develop communication strategies that resonate with residents. It has now been well-established that the language used to refer to planned relocation matters. If "managed retreat" rubs people in the community the wrong way, what term will be more effective at engaging people in a conversation? Even beyond the term chosen to refer to relocation, language is essential. In some communities, planning jargon may be a turn off.[101] For this reason, Hampton, New Hampshire ultimately chose to refer to protection as "keeping water out," accommodation as "living with water," and managed retreat as "getting out of the water's way."[102] In other communities, the topic of climate change may be so politicized that it is best to avoid using that term at all. Community organizers advocating for a buyout program in Staten Island found this to be the case and chose to frame flooding as a problem caused primarily by overdevelopment instead of by climate change.[103] Without communities playing a central role in developing the language with which to discuss relocation, residents may shut down before the conversation even begins.

---

[101] Climigration Network. (2021). "Lead with Listening: A Guidebook for Community Conversations on Climate Migration."
[102] Georgetown Climate Center. (n.d.) "Managed Retreat Toolkit."
[103] Isacoff, Rachel (2021). "Identity and Power: How Cultural Values Inform Decision-Making in Climate-based Relocation."

Transparent Options and Real Choices

Relocation from flood risk is typically framed as a voluntary choice made by individuals, or sometimes entire communities. All too often, however, at-risk people are stripped of true choice due to lack of agency, information, or resources. By improving transparency in the process, practitioners can preserve real choice—informed by clear understanding of the options—for those contemplating relocation. A critical step in achieving this is providing accurate data that clearly illustrates risk. In Piermont, NY, for example, planners leading a community engagement effort about flood risk and relocation provided all participants with property-specific assessments of flood risk.[104] This kind of hyper-local data combined with clear climate projections ensured that residents had an accurate understanding of their current and future risks.

Transparency around the costs and timescales of alternative adaptation solutions, such as hardscaping coastlines, will also provide communities with better information to make decisions for themselves. For example, the U.S. Army Corps of Engineers just approved a $237 million beach nourishment project along 10 miles of Topsail Island in North Carolina—the most costly project of this type ever in the state.[105] While the project promises to reduce flood risk, the average lifespan of a nourished beach in North Carolina is three years.[106] If the decision to move forward with this project was framed as a choice to spend that money on a short-term solution or on a long-term solution, such as relocation, would the money have been spent the same way? Simply posing relocation as an option during pre-disaster planning and outlining the relative

[104] Marcell, Kristen, Nava Tabak, Bill Nechamen, and Bennett Brooks. (2020). *Making it Personal: Getting Vulnerable Neighborhoods to Talk about Long-Term Flood Risk* [Webinar]. Climigration Network.
[105] Pilkey, Orrin, Sarah Lipuma, and Norma Longo (2021). "Retreating From the Waves."
[106] IBID.

costs and timeframes can help communities grasp the full range of adaptation options available to them.

Integration into Holistic Planning

If planned relocation is to successfully deliver equitable benefits to those involved, it must be fully integrated into holistic community planning that goes far beyond climate migration. The outcomes of relocation are tightly wrapped up in housing policy, open space management, economic opportunity, racial justice, and more. If considered not as a goal in and of itself, but as a tool that can be used to meet a host of other societal goals, relocation can serve as a vehicle for positive social change in addition to a powerful climate adaptation strategy.[107] Take open space management as an example. If land left behind from bought out properties is converted to public parks or restored wetlands, it can deliver a myriad of public benefits. Such an approach fulfills multiple criteria within FEMA's Community Rating System, which would lead to reduced flood insurance costs for city residents.[108]

Integrated planning processes will require strong partnerships across sectors, departments, and jurisdictions. Climate adaptation professionals must commit to working with experts in economic development, affordable housing, education, and transportation to plan for the changing demands in both the receiving and remaining communities.[109] It is essential that relocation is paired with affordable housing development and relocation support to ensure people have safe, comfortable homes to move into.[110] When relocation is seen as a tool to advance other

[107] Siders, A.R. & Hino, Miyuki & Mach, Katharine. (2019). "The Case for Strategic and Managed Climate Retreat." *Science.*
[108] Tsang, Maggie, and Isaac Stein. (2021). "Losing Ground: Rethinking Land Loss in the Context of Managed Retreat."
[109] Siders, A.R. & Hino, Miyuki & Mach, Katharine. (2019). "The Case for Strategic and Managed Climate Retreat." *Science.*
[110] Morris, Deborah Helaine (2021). "The Climate Crisis is a Housing Crisis: Without Growth We Cannot Retreat."

goals, it has the potential to support economic mobility, sustainable development, and racial justice. To do this effectively, practitioners must always consider risks that are overlapping with climate hazards.[111] For example, how might rapid urbanization, public health crises, housing shortages, or racial discrimination be exacerbating a household's risks? This holistic approach does not fit neatly into one-off project timelines. Rather, it requires long-term commitment from community leaders to stay in the work for as long as it takes.

Empathetic Community Engagement

The best practices described thus far require deep community engagement to be successful. While there are inclusive practices, such as providing translations and multiple modes of participation, that are always essential to an equitable engagement process, there are special considerations that must be made for engagement around relocation. Considering leaving a place you have lived your whole life or experiencing multiple natural disasters can be devastating—even traumatic. As such, practitioners engaging communities around this topic must be equipped not only with data and facts, but also with empathy and the skills to conduct emotionally and culturally sensitive engagement. This means recognizing that fear, grief, and anxiety will all affect the way people react to discussions about relocation; and that these emotions may be especially intense for people with strong ties to the land, such as Indigenous People, farmers, and people whose families have lived there for generations.[112] This requires being trained in trauma-informed engagement that acknowledges the legacy of past government-led relocations (e.g., Trail of Tears, Indian Removal Act, Japanese-American internment camps, and urban renewal

[111] Doberstein, Brent, Patrick Sauders-Hastings, Michael Bernard, and John Somerville. (2020). *Planned Retreat Approaches to Support Building Long-Term Climate Resilience* [Webinar]. Climigration Network.
[112] Climigration Network. (2021). "Lead with Listening: A Guidebook for Community Conversations on Climate Migration."

projects). It may require partnering with licensed professionals[113] or conducting professional development sessions that help practitioners become comfortable talking about climate grief, trauma, and injustice.[114]

While there is no end to the methods practitioners can employ to facilitate empathetic engagement, I will outline a few techniques described by the Climigration Network, most of which were employed during relocation discussions in Piermont, NY.[115] One is to have participants respond to a fictional story about relocation. This may allow people to consider the issue more objectively by temporarily removing an emotional barrier. Another is to create safer spaces to have difficult conversations. In Piermont, planners achieve this through "living room conversations" where they spoke with people in their own homes and through Local Liaisons, who were community members hired to conduct some of the outreach. Both techniques bring a sense of safety and intimacy that can ease the tension of having difficult conversations. A final example is creating individual risk questionnaires that include emotional risk. Having people consider emotional risk alongside physical risk from the start may help them work through difficult choices more proactively.

As Deborah Moser frames it, climate relocation "entails the ever-present opportunity to take on communication in a deliberate, respectful, empathetic, culturally appropriate, mindful, and reparative fashion."[116] When seen as an opportunity to ease a difficult practice, community engagement can serve not only as a means to gather feedback, but also as a critical step in

---

[113] Climigration Network. (2021). "Lead with Listening: A Guidebook for Community Conversations on Climate Migration."
[114] Moser, Susanne C. (2021). "Waves of Grief and Anger: Communicating through the 'End of the World' as We Know It."
[115] Marcell, Kristen, Nava Tabak, Bill Nechamen, and Bennett Brooks. (2020). *Making it Personal: Getting Vulnerable Neighborhoods to Talk about Long-Term Flood Risk* [Webinar]. Climigration Network.
[116] Moser, Susanne C. (2021). "Waves of Grief and Anger: Communicating through the 'End of the World' as We Know It."

finding acceptance and deriving meaning in climate adaptation. Effective community engagement can help reframe relocation as the beginning of a new chapter, rather than the end of one.

Massachusetts Coastal Resilience Review

Due to varying levels of climate vulnerability, different bureaucratic structures, and unique population profiles, every state that pursues relocation planning and implementation will face its own set of challenges and successes. Because the analysis included in this thesis is rooted in Massachusetts communities, it will be helpful to situate that analysis in the Massachusetts context. This section briefly presents the sea level rise projections that may necessitate relocation, the existing structures in place to manage coastal issues, and the current state of coastal resilience planning.

Sea Level Rise in Massachusetts

Melting land ice and thermal expansion of ocean waters is causing sea levels to rise around the globe at an increasing rate. Over the course of the 20th century, global sea levels rose nine inches. Eight additional inches of sea level rise is projected by 2030—a rate nearly three times as fast as recorded last century.[117] In 2050, sea levels in Boston may be 1.5 feet higher than in 2000; and in 2070, up to three feet higher.[118] Many coastal towns in Massachusetts are already experiencing flooding from hurricanes, nor'easters, rain, snow, and tides. These climate hazards will be exacerbated by rising seas, worsening flood risks along the coast.

The First National Flood Risk Assessment, created by First Street Foundation, reported increasing flood risk in Massachusetts. In 2020, 193,300 properties were deemed to have "substantial risk." That number is projected to increase by 11.4% to 215,400 by 2050.[119] Of the properties currently at risk, 46,800 were characterized by a 99% chance of flooding at least once

[117] "Climate Ready Boston." (2016). City of Boston.
[118] IBID.
[119] "The First National Flood Risk Assessment." (2020). First Street Foundation.

in the next 30 years.[120] Storms of increasing intensity are routinely impacting Massachusetts homes and infrastructure. For example, Hurricane Sandy affected 7,901 properties in 2012.[121] As a result of flood damage, 88,000 property owners have made flood damage claims through FEMA's National Flood Insurance Program or Individual Assistance Program since 2000.[122] These numbers all illustrate one thing: flooding is a current and growing threat to Massachusetts people and property.

State Actors and Funding Sources

While responding to the impacts of climate change requires collaboration across many agencies and departments, the Executive Office of Energy and Environmental Affairs (EEA) and the Office of Coastal Zone Management (CZM) are primarily responsible for coastal resilience initiatives at the state level. EEA was created in 1975 with the mission to "safeguard public health from environmental threats and to preserve, protect, and enhance the natural resources of the Commonwealth."[123] Within this agency sits CZM, which is the lead policy and planning agency for coastal and ocean issues. Its mission is "to balance the impact of human activities with the protection of coastal and marine resources through planning, public involvement, education, research, and sound resource management."[124] CZM is funded by annual grants from NOAA and was created in response to the national Coastal Zone Management Act of 1972, which established a voluntary program for states that wanted to create plans to manage coastal resources.[125]

---

[120] "The First National Flood Risk Assessment." (2020). First Street Foundation.
[121] IBID.
[122] IBID.
[123] "Brief History of EEA." (n.d.). Massachusetts Executive Office of Energy and Environmental Affairs.
[124] "Massachusetts Office of Coastal Zone Management." (n.d.) Mass.gov.
[125] IBID

Both EEA and CZM have grant programs that enable Massachusetts municipalities to pursue coastal resilience initiatives, which could be leveraged to plan for relocation. EEA runs the Municipal Vulnerability Preparedness program (MVP), which offers grants to advance climate action and resilience after communities have completed an initial vulnerability assessment. To date, MVP grants have been used to advance coastal resilience through stormwater master plans, green infrastructure projects, targeted flood vulnerability assessments, and more.[126] CZM has a Coastal Resilience Grant Program that is intended for municipalities and non-profits looking to address coastal flooding, erosion, and sea level rise impacts. In 2021, CZM provided $4 million in funding for 19 projects. The grants are most frequently used for public outreach, vulnerability assessments, planning processes, engineering projects, and natural storm damage protections—most of which could be used to support planning for relocation, if desired.

Coastal Resilience Planning in Massachusetts

While discussions about planned relocation in Massachusetts are slowly starting to emerge, most coastal resilience planning in Massachusetts to date has centered around risk assessments, protecting existing structures in place, and nature-based solutions. Through the aforementioned grant programs and other initiatives, the Commonwealth has prioritized developing a clear understanding of projected risk from sea level rise both at the local and state levels. Communities up and down the coast have completed coastal vulnerability assessments to help guide their adaptation approaches. At a larger scale, the Woods Hole Group was commissioned by MassDOT to develop the Massachusetts Coast Flood Risk Model (MC-FRM) to provide property owners, planners, and policy makers with more accurate and detailed sea

[126] "FY21 Completed Action Grant Summaries." (2021). MA Executive Office of Energy and Environmental Affairs.

level rise and storm surge risk projections. Their work provides a more dynamic, forward-looking model than flood maps from FEMA that are grounded in historic flood events.

In many of the most vulnerable areas of the state, Massachusetts has relied on feats of engineering and nature-based solutions to protect existing infrastructure. Examples include the 20-foot tall New Bedford Harbor Hurricane Barrier, seawalls all along the coast, marsh and wetland restorations along the Neponset River, and the Plymouth Harbor Breakwater, just to name a few.

Discussion of planned relocation has occurred mainly at the periphery of coastal resilience initiatives but are gradually gaining traction as something worth exploring. For one thing, relocation has received more media attention over the past few years. Stories with the following headlines were all published by local news outlets between 2018 and 2021:

- "Entrench or Retreat? That is the Question on Plum Island" (WBUR: Sept, 2018)
- "Rising Seas: Time for Mass. Towns to Retreat from the Coast?" (NBC: Dec, 2020)
- "Amid Climate Change Threats, Cape Planners Ask: Is It Time to Retreat from the Coast?" (GBH News: March, 2021)
- "Managing the Climate Crisis May Require a Managed Retreat" (The Boston Globe: May 2021)

These stories were all derived from discussions happening at the local level in Massachusetts. While not the norm, there are examples of communities beginning to see retreat from sea level rise as an option to seriously consider. For example, Rockport invited expert A.R. Siders to present a public webinar in January 2022, introducing managed retreat as an adaptation option for Long Beach.[127] Developing a managed retreat framework in Newburyport has been deemed a

[127] Siders, A.R. (2022). "Managed Retreat Introduction for Rockport, MA."

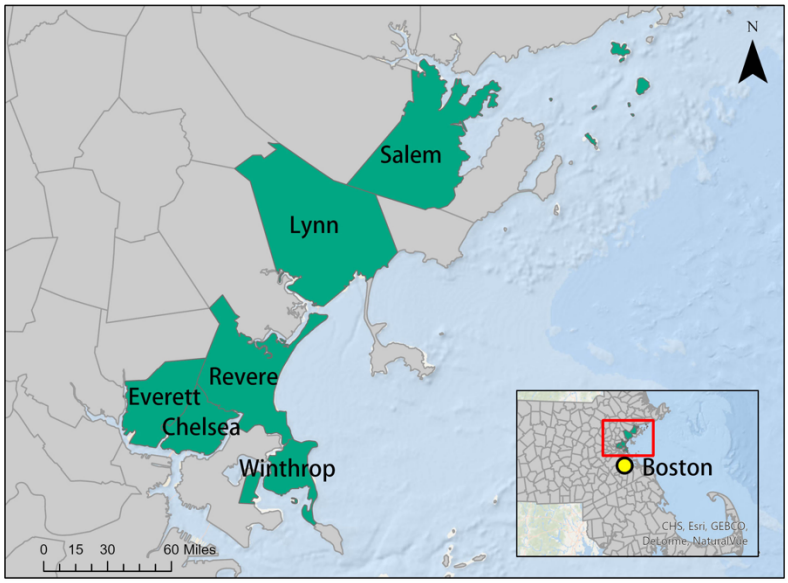
top priority.[128] In Scituate, planners worked with the Metropolitan Area Planning Council (MAPC) to complete a managed retreat feasibility study for Peggotty Beach in January 2022.[129]

In addition to locally led discussions, there have been recent efforts to advance relocation at the state level as well. State representative Sarah Peake and Senator Marc Pacheco filed a proposal for "An Act Establishing a Massachusetts Flood Risk Protection Program." The program, under consideration during the 2021-2022 legislative session, aims to "proactively eliminate the risk of catastrophic flood damage to individuals, families, small businesses, neighborhoods, infrastructure, and first responders," by helping "property owners and renters move out of harm's way, while permanently conserving and restoring the land to restore habitat and climate resiliency functions and provide community benefits."[130] The bill recognizes—and seeks to fill—the lack of a state-led, comprehensive, and voluntary property buyout program. The program includes provisions for relocation assistance for owners and renters and would require that 75% or more of the program funds go to low-income or environmental justice populations. While the bill is still far from law, its creation shows a growing commitment from Massachusetts policymakers to ensure relocation is seen as an option for adaptation.

[128] Rios, Simon. (2018). "Entrench or Retreat? That is the Question on Plum Island." WBUR.
[129] "Peggotty Beach Retreat Feasibility Study." (2020). Metropolitan Area Planning Council.
[130] "An Act Establishing a Massachusetts Flood Risk Protection Program." (2021). The Trustees.

Community Profiles

In order to take away the full implications of responses from the Massachusetts-based interviewees, it is important to have an understanding of the communities they serve. This section presents a brief profile of each community, including basic demographic information, relevant development patterns, and past and ongoing efforts to address coastal resilience. The chart below supplements those profiles, comparing community statistics with state averages. Unless otherwise noted, the information from the community profiles came from the 2020 US Census and interviews with community stakeholders.



Six coastal communities were represented in the study.

City/ Town	Land Area (square miles)	Pop (2020)	Pop growth since 2010	Pop in EJ block	Non-white	Foreign-born	Median Household Income	Owner-occupied housing rate	Language other than English spoken at home
Chelsea	2.21	40,787	15.9%	100%	51.6%	45.4%	$56,802	26.5%	69.8%
Everett	3.43	49,075	17.8%	100%	42.2%	43.1%	$65,528	38.6%	57.9%
Lynn	10.74	101,253	12.1%	93.2%	51.4%	36.7%	$56,181	44.9%	53.6%
Revere	5.69	62,186	20.2%	93.3%	21.9%	39.0%	$62,568	49.9%	51.7%
Salem	8.28	44,480	7.6%	45.6%	21.0%	14.6%	$68,808	51.5%	22.0%
Winthrop	1.97	19,316	10.4%	26.5%	7.1%	15.9%	$74,069	55.9%	23.0%
Massachusetts	**7800.1**	**7,029,917**	**7.4%**		**79.4%**	**16.8%**	**$81,215**	**62.4%**	**23.8%**

Chelsea

Chelsea is the smallest city in Massachusetts by land area. It is a majority minority city with 100% of the population living in Environmental Justice (EJ) designated census blocks. It is the second most densely populated city in Massachusetts and has a very high percentage of renters compared to homeowners. It has a large immigrant population and is home to the second highest percentage of Latinx residents in the state.

The city's development pattern has resulted in its industrial and commercial areas to be most at risk to current flood risks. During the Industrial Revolution, the city industrialized rapidly following the maritime development of the region. The dense, multifamily residential areas that formed during that period are located primarily in higher elevation areas, though some have crept down to low-lying areas. During the late 19th century and early 20th century, many of the salt marshes in Chelsea were gradually filled in to accommodate additional growth. These low-lying, former tidal areas encompass the city's current commercial and industrial base, but also includes some residential areas, public infrastructure, and community assets. Of particular concern from a flood risk standpoint are the Island End and Mill Creek industrial and commercial areas, the former of which is home to the New England Produce Center.

Chelsea has a number of past and ongoing efforts to assess and address flood risk. In 2017, Chelsea—partnering with the City of Everett, Chelsea GreenRoots, and the Mystic River Watershed Association—commissioned a Coastal Zone Management project to evaluate current and future flood risks in the Island End River area and develop a draft design for a flood barrier. From there, the two cities secured Municipal Vulnerability Preparedness (MVP) action grant funding to implement the next phase of the project, including community engagement, regional coordination, design advancement, and more. The cities are now actively pursuing a $50 million

FEMA BRIC grant to complete the flood protection system to fortify the Island End district. On top of this infrastructure project, Chelsea has developed an Equitable Climate Resilience Framework to guide this work and secured a grant from the Barr Foundation to start the North Suffolk Office of Sustainability & Resilience with Revere and Winthrop in an effort to advance this work on a more regional scale.

Everett

Everett—Chelsea's neighbor to the west—is a city of nearly 50,000 people, all of which live in census blocks that are designated as EJ neighborhoods. While its footprint is small, the city is experiencing rapid population growth and redevelopment of its industrial area. The Everett side of the Island End River area is largely commercial with a lot of trucking activity and is vulnerable to flooding. Both the Lower Broadway and Commercial Triangle economic development districts are at or below sea level rise, which—combined with the large amount of impervious surface in those areas—make them very vulnerable to flooding as well.

To address flooding within its borders, Everett has partnered with Chelsea on the Island End Resilience Project described above. They are also working on several projects to improve the resilience and capacity of their stormwater drainage infrastructure to better prepare for large storms. These efforts include restoring a concrete channel to its natural state, studying storm flows, restoring wetlands, and rezoning commercial areas to encourage a shift from impervious surfaces to green space.

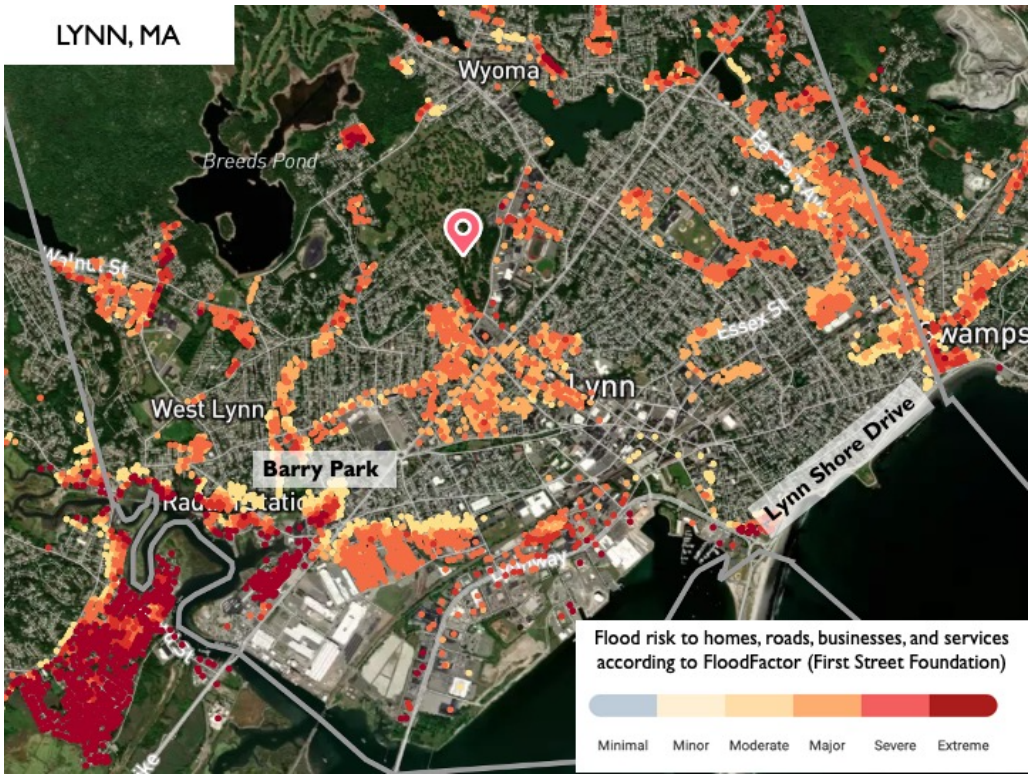
Lynn

Lynn is the largest city included in the study, both by land area and population. Like Chelsea, it is a majority minority city. 93.2% of Lynn's population lives within an EJ designated census block. At just over $56,000, the city's median household income falls far below the state average. On top of these socio-economic vulnerabilities, Lynn is already highly affected by flooding—an issue that is often brought up by community members during public meetings.

Waves crashing along Lynn Shore Drive in January, 2022.

Half of Lynn's shoreline is exposed directly to the ocean along Lynn Shore Drive. While this higher-income section of the city may be vulnerable to sea level rise and flooding in the future, it is currently well-protected by a state-owned seawall. The harbor side of the waterfront, on the other hand, is suffering from an eroding shoreline that increases its vulnerability to flooding. This section of the city is mainly post-industrial with limited active uses and is home to an old landfill. Much of the current flooding in Lynn is inland flooding along the Strawberry Brook watershed that is now underground and culverted. The neighborhood around Barry Park and Boston Street—which is an EJ neighborhood—feels the effects of this flooding most acutely.

Addressing flood risk is starting to become more of a priority. In 2016, Lynn hired Weston & Sampson to complete a Coastal Resilience Assessment to evaluate sea level rise and coastal flooding risks and develop adaptation strategies. Since then, Lynn has secured three MVP action grants. The first was to model the hydrology of the Strawberry Brook, taking future sea level rise projections into account. The grant resulted in the Strawberry Brook Stormwater Climate Resilience and Implementation Plan, which recommended green infrastructure and other solutions to mitigate flood risks. The other two MVP grants were to implement strategies from the plan.



Revere

Revere borders both Everett and Chelsea and is just south of Lynn on the shoreline. Like these other communities, Revere is a predominately EJ community with 93.3% of its population falling in a designated census block. The city is experiencing a boom of development and population growth. With so much of its area along the shoreline, Revere faces major flood risks. 30% of the city falls into FEMA's 100-year floodplain, and it has the second largest number of flood insurance policies in the state. Revere has a long peninsula that is home to Revere Beach and the Point of Pines neighborhood. Point of Pines lies entirely in FEMA's100-year floodplain and residents there span a wide range of income levels and are all quite vulnerable to flooding. Revere Beach is also at risk and is experiencing rapid development, especially of luxury condos. Other neighborhoods of concern are Oak Island neighborhood, Lower Shirley Ave, Rogan's Point, and Beachmont, most of which are EJ neighborhoods.

A 2021 high tide along Winthrop Parkway in Revere (Source: Jesse Costa/WBUR)

In 2021, Revere completed a Coastal Resilience Feasibility Study for the Point of Pines and Riverside Area to identify solutions to avoid or minimize damages associated with sea level rise and coastal storms. They also completed a comprehensive plan in 2020 that included a chapter about climate, which addressed flood risks and the need to build coastal resilience.

Salem

Salem is the northernmost city examined in this study, just north of Lynn. It is a slightly more affluent city than the others with a median household income of nearly $69,000, but still has a significant portion of its population falling in EJ census blocks at 45.6%. The city falls between the Salem Harbor and Beverly Harbor, the latter of which feeds into the Danvers River. As a city surrounded by water, there are areas that are particularly vulnerable to flooding. The Point/Palmer Cove neighborhood is the city's largest EJ neighborhood characterized by dense housing, mixed use areas, and a large Latinx population. It is among the most vulnerable of Salem's neighborhoods to flooding. The Willows, located at the end of a peninsula, is also especially exposed to flood risks.

In 2019, Salem received MVP action grant funding to implement green infrastructure projects around the city. In 2020, they received another grant to explore flood mitigation solutions for the Ocean Avenue pump station. Their most recent flood mitigation project is a neighborhood-by-neighborhood assessment of expected sea level rise and storm surge impacts with an eye toward flood mitigation solutions. As of 2022, this work is currently underway, starting in the Point/Palmer Cove neighborhood.

Winthrop

Winthrop is the biggest outlier in the study's set of cities in terms of socio-economic status. It is over 90% white, has a median household income of over $74,000, and only 26.5% of the population lives within an EJ designated census block. Despite a less socially vulnerable population, Winthrop is facing substantial flood risks. It is around a third of the size of Revere but has half the number of flood insurance policies. 45% of homes in Winthrop fall in the FEMA flood zone. Compared to some of the other cities in which there are more commercial and

industrial areas at risk of flooding, Winthrop is far more residential, leaving residents more exposed to flooding. To begin to address these issues, Winthrop secured a 2019 MVP action grant to explore climate resilient land use and zoning practices and to develop resources and tools to increase resilience to flooding, including a flood resilience checklist for residential properties and a list of climate resilient land use strategies.

Interview Findings

The following section provides a thorough summary and discussion of the responses from the 10 interviewees. The section opens with a look at how these communities are addressing coastal flooding issues and the extent to which relocation has come up as an option for discussion. From there, it turns to six key considerations that will influence relocation planning in Massachusetts: the demographic makeup of the region; the impact of the Boston housing market; municipal readiness to engage in the topic; the current state of regional planning in the area; the ability of municipalities to engage in long-term and holistic planning efforts; and the current level of public trust in their local governments. Finally, the section concludes with thoughts about how residents might react to buyout proposals in the future. As a whole, the section provides insight into the past, present, and future of coastal resilience planning in Massachusetts with a focus on key implications for planned relocation. All quotations and information included in this section came directly from the 10 interviewees.

State of Coastal Resilience Planning

Every community that participated in an interview has demonstrated a commitment to addressing coastal resilience and protecting their residents and infrastructure from flood risks. To date, most of that commitment has shown itself through studies to assess risk, projects to fortify existing infrastructure, and steps to ensure new development takes climate risk into account. Nearly every community referenced work done to assess risk and identify mitigation options. Examples include a neighborhood-by-neighborhood flood risk assessment in Salem, hydrology modeling of the Strawberry Brook watershed in Lynn that includes future sea level rise projections, a flood risk assessment in the Point of Pines neighborhood of Revere, and a handful of stormwater resilience assessments.

Many communities are starting to move beyond risk assessments, implementing hardscaping or green infrastructure projects to mitigate existing and future flood risks. The largest project underway is the partnership between Chelsea and Everett to protect the Island End River area through a $50 million FEMA BRIC grant that would go toward building a seawall. While other communities, such as Revere, mentioned proposals for large hardscaping projects, many interviewees expressed a shift towards prioritizing green infrastructure and nature-based projects. For example, Everett is working on a project to naturalize an undersized concrete channel in the north end of the city to reduce flooding. John Walkey of GreenRoots referred to the "magic unicorn" of coastal resilience projects: waterfront parks that serve as flood protection for inland neighborhoods during storms, but also deliver community benefits on a daily basis. These kinds of projects are of interest to both municipalities and non-profits in the area.

Another common theme of current flood mitigation efforts is working to ensure the resilience of new development to climate risks. Interviewees mentioned working with developers to encourage climate-resilient design and rezoning commercial areas to require more green space in new development. After the proposal came in for Amazon to build a fulfillment center near Island End River, the City of Everett came to an agreement with the company that would both protect their new building and improve the overall resilience of the area. The City agreed to pay for the daylighting of a nearby creek to increase capacity if Amazon paid for a larger culvert. Amazon also entered a Tax Increment Financing agreement to eventually provide $4 million in funding to further protect the area from flooding. These examples provide insight into the current state of coastal resiliency and lay the foundation for discussions about relocation as a coastal adaptation strategy.

Prevalence of Relocation Discussions

Before diving into the prevalence of current relocation discussions, it is informative to note that Revere has actually implemented buyouts for flooded properties in the past. After the blizzard of 1978, FEMA sponsored the elevation of certain structures in the floodplain, along with buyouts of six properties. Those homes were demolished, and the land was put into a conservation trust. Reflecting on the process, floodplain manager Frank Stringi remarked: "There were a number of residents that were sick and tired, year after year, of having to deal with flooding issues and going back and repairing the damages, so they threw in the towel, and they said 'yeah, we'll take advantage of the buyout program.'" Of the residents who accepted the buyouts, Frank Stringi remembered: "They just had enough. Mentally, socially—it was just too much drain on them year after year, and they just wanted out." This historic example of an implemented buyout program in the region may serve as an illustrative model going forward.

Currently, the extent to which participating communities are considering relocation as an option varies from almost not at all to informal and high-level discussions. At one side of the spectrum is Revere that reports very little discussion about relocation despite the 1978 buyout example, saying "our resiliency efforts have been more targeted towards floodproofing measures and mitigation rather than considering retreat." The most common response was that relocation has come up informally in public meetings or in high-level conversations among city staff members. This was true of Everett, Chelsea, Lynn, and Salem. Both Everett and Lynn report relocation coming up in stakeholder meetings for their Hazard Mitigation Plans (HMP), and in Lynn, they included a "soft" recommendation in their HMP to consider relocation as an option. In Salem, relocation has been discussed informally by the Sustainability and Resilience Department while discussing adaptation solutions for the Point neighborhood. The Sustainability

and Resilience Manager reported, “[Relocation]’s been mentioned a few times, but we've never really sat down and just talked about that.” Perhaps the most concrete example of current relocation discussions came from Lynn, in which members of the planning department referenced informal conversations about property buyouts of a few homes that are facing repetitive flood damage around Barry Park. Speaking to his experience working in the Greater Boston area, John Walkey of GreenRoots summed up the landscape of relocation discussions, saying: “Ultimately nobody is talking about sacrifice zones at this point. Everyone is assuming the landmass they have today will be the landmass they have tomorrow.”

Despite lack of current substantive discussion about relocation planning, many interviewees expressed the acknowledgement that it will have to be considered in the future given the dire sea level rise projections in the region. One interviewee referenced the extent to which climate reports, such as those coming out of the IPCC, are getting worse and worse, alluding to the fact that we will need to take a more aggressive approach to adaptation in the future. For some, that sense of urgency to ramp up adaptation efforts is already here. Darya Mattes of the North Suffolk Office of Sustainability & Resilience referenced the Point of Pines and Riverside neighborhood flooding vulnerability study in Revere, noting that “there are areas that in just a few years there won‘t really be a viable option for any sort of flood protection barrier. Everything's too low.” Frank Stringi, the Floodplain Manager in Revere, expressed his concern that flooding will soon be an issue that is affecting people monthly. Esmeralda Bisono in Salem reiterated these concerns, saying, “we all know that's something we need to think about, and we can't just put in on the backburner anymore and not do anything.”

Key Considerations in Future Relocation Discussions

While conversations surrounding relocation as an adaptation strategy are few and far between among Massachusetts municipal planners, interviewees had valuable insights on many factors that influence the feasibility of implementing equitable relocation. From demographic-specific considerations and financial implications to the nature of the Greater Boston housing market and municipal readiness, the following section summarizes interview findings on an array of topics that have implications for the future of relocation planning in Massachusetts.

Demographic Analysis

Every interviewee spoke to the fact that the impacts of climate change will be felt differently by different populations. Age, income, race, immigration status, housing status, and language ability all come into play when it comes to preparing for and bouncing back from an emergency, accessing information, and navigating government systems. Interviewees were explicit about such equity factors making them wary of considering relocation as a solution. Alex Train in Chelsea spoke to this tension most directly, saying: "[Relocation] can run contrary to our equity objectives. In a place like Chelsea that's densely settled and where almost 75% of residents are renters, the opportunities to execute managed retreat and preserve equity—or promote equity—are few and far between." This concern for preserving equity ran through each interview. This section digs into the specific concerns for a range of populations.

The need to give special attention to EJ communities came up in most interviews. Representatives from Everett and Chelsea drew attention to the fact that their entire cities are EJ communities, and the other communities also noted the importance of considering the needs of their EJ communities. This need for special attention came up both in the context of EJ communities being inequitably exposed to flood risk and having less capacity to respond to

disasters. While there were plenty of examples of more affluent populations being at risk of flooding, Aaron Clausen in Lynn drew attention to a general trend of increased risk for low-income, minority populations: “Historically underrepresented communities are affected most by climate change. You look at the way those demographics layout—they end up in neighborhoods where flooding is frequent.”

The three components of the Massachusetts definition for an EJ community—low income, minority, and language isolation—came up independently of general discussions about environmental justice. Interviewees shared specific concerns for each category as it relates to the prospect of relocation. Income came up the most. Some interviewees expressed that low-income residents would be left out of relocation planning processes because they are preoccupied with more immediate concerns, such as balancing multiple jobs, providing food for their family, and dealing with health problems. Others spoke to a lack of the financial safety net needed to rebound from natural disasters. Alex Train in Chelsea stated: “Our residents don't have the economic safety net necessary to withstand natural disasters. Taking a week off from work for many of our residents is an unacceptable option. They simply don't have the resources to survive.” The lack of financial resources is an issue beyond just rebounding from a storm—it also makes considering relocation far more difficult. Especially in areas that are vulnerable to flooding that have lower property values, families contemplating relocation will likely find that a safer location is more expensive. As a result, Maria Belen Power of GreenRoots expressed concern that those who cannot afford to relocate would stay in at-risk areas and just ride out the crisis.

Another concern relating to low-income residents was that they would not have access to state and federal programs designed to facilitate relocation in the same way that more affluent

neighbors would. John Walkey of GreenRoots pointed to systemic failure as the cause for this discrepancy: “Federal money will come in to help somebody and we know that it will not be low-income folks. It's going to be helping out people of means because that's just how the system works.” In drawing this conclusion, he used the MassSaves program (a Massachusetts Department of Energy Resources initiative to advance energy efficiency in homes and businesses) and Covid relief programs as examples where this has already played out, saying that even though low-income people contribute to funding these programs, they are not the ones who benefit from them. He elaborated saying: “People who are able to take advantage of those programs tend to be wealthy, white people because they know how the system works. They know who to call and people respond to them. If you're low income or a person of color and you call up for this help, you're going to have a hard time of it if you even know who to call.” John’s colleague at GreenRoots, Maria Belen Power, reinforced the concern that low-income residents will not benefit from future relocation programs in the way wealthy residents will. Her concern was that buyouts or other programs would have a match funding requirement (e.g., FEMA pays 90% of the costs if the individual can pay 10%) that proves to be cost prohibitive for low-income residents.

The other two components of EJ communities—minority populations and language isolation—came up most explicitly in conversations about immigrant populations. Several interviewees expressed concern that immigrants with limited English proficiency, or other residents with limited English proficiency, would be left out of relocation planning processes. While some interviewees expressed optimism that engagement with non-English speakers was improving in their cities through the use of interpreters and translated materials, others felt that those who don’t speak English would fly under the radar in discussions around relocation and

would not have the same level of access to necessary information. When it came to the emotional response of immigrants contemplating relocation, there were mixed hypotheses. One interviewee speculated that immigrants may be more willing to move given the opportunity because they may not have the same level of connection to place as families who have lived in the area for generations. Another disagreed, suggesting that some immigrants have found very supportive communities in the area, which they would lose if they moved somewhere else.

Considerations for undocumented residents were raised in several interviews. A participant from Everett estimated that while the 2020 census reported a population of around 50,000, the actual population is closer to 65,000 when including undocumented residents. Given the significant undocumented population in the region, their individual needs must be given special attention in relocation discussions. Interviewees expressed that undocumented residents in their cities lack the social support networks to navigate disasters and that they would be reluctant to seek support from the government in fear of being deported.

Renters were another group that interviewees flagged as a key equity consideration in potential relocation planning. All of the communities involved in the study have a higher rate of renters than the Massachusetts average. None have as high a concentration as Chelsea with nearly 75% of residents renting. Accordingly, Alex Train in Chelsea was particularly tuned into the challenges of equitably relocating renters, saying, “In places where there are concentrations of vulnerable tenants with limited lifelines to the local economy, it’s a harder concept to implement.” He felt buyouts and other forms of relocation felt more feasible with owner-occupied units. Others shared this sentiment, worrying that renters would lose out on the potential financial benefits of planned relocation and left out of the planning process. Darya Mattes of the North Suffolk Office of Sustainability & Resilience called out the shortcomings of

buyout programs for renters and the need for supports directed specifically at renters: “Buyout programs really serve people who own their homes. People get the pre-disaster value of their home and buy a new home. If someone’s a renter, they just lose their housing, and a buyout program doesn’t really address that at all. There would need to be some kind of assistance for people finding new housing and programs that create new housing.” Tom Philbin of Everett was most concerned about the outcomes for renters with absentee landlords who don't live in the city and are not connected to their planning efforts.

While low-income residents, immigrants, undocumented residents, and renters were the most commonly cited populations of concern when it came to equitable relocation outcomes, there were a smattering of additional categories of people that were mentioned in interviews as people either likely to be overlooked in a planning process or people that would have more specific needs than the general population. Several interviewees mentioned the elderly and those with disabilities, pointing out that they would have a harder time getting around during periods of flooding. One interviewee mentioned those experiencing homelessness, wondering if it would be difficult to assist them if the need to relocate arose given his past personal experiences in which people experiencing homelessness have been unwilling to accept government help. Others brought up those with mental health issues, unaccompanied youth, and anyone with pre-existing special needs. Acknowledging the vast range of needs across the region’s population, one interviewee concluded that in any relocation efforts “all [engagement around relocation] needs to be done on a case-by-case basis” and “it’s not just one stroke of the brush that is going to answer everything.”

Boston Housing Market

No region will face the same set of considerations and challenges when contemplating relocation. Compared to a small, rural community, the Greater Boston region faces a unique barrier to planning for and implementing relocation: its housing market. Boston's housing shortage and popularity as a place to live and work has created a booming real estate market. As a result, cities and towns surrounding Boston are seeing an uptick of residential redevelopment projects. Many interviewees mentioned feeling the effects of the Boston housing market reaching their borders. While some cited increased municipal revenue as a benefit of the redevelopment, others expressed great concern over the "unprecedented period of displacement" caused by rising housing costs that is outpacing increases in wages and speculative real estate activity that is increasing property values and rents.

The nature of the Boston housing market directly affects the feasibility of relocation. It means that instead of a natural trend away from building in areas with flood risk, the region is seeing a rush of development in at-risk areas. For example, in Revere, there are housing developments being constructed in floodplains along Revere Beach. One participant expressed great concern over this pattern, saying, "they're building in a space [Revere Beach] that was underwater during the blizzard of '78, so everything they're building is going to get obliterated." The current market forces and development trends are working in direct opposition to goals to move people away from flood risks. People are moving into housing that allows them to be close to Boston and close to the waterfront faster than they are moving away from flood risks, bringing a wave of gentrification that is only increasing housing prices.

Given this housing and development landscape, barriers to equitable planned relocation are exacerbated. First, the participating communities are all quite densely developed, meaning

there is not much land available for new housing for those that may have to relocate away from frequently flooded areas. One interview elaborated on this concern: “If you're losing a bunch of coastal housing stock, where's that new housing being built? Is it being built in a place where people can still get to work and access community resources that that are important to them?” Not only do planners have to think about where people might move, but also if those new locations provide residents with the same access to employment, transportation, and more. That gets harder to do the further people have to move. Second, relocation runs the risk of accelerating the displacement that is already happening due to rising housing costs because many at-risk residential buildings are inhabited by low-income residents. Several interviewees spoke to this concern directly. One emphasized, “relocation *is* displacement even if you are doing it for a good reason, to mitigate loss and property value loss.”

On the positive side, because gentrification and displacement are such prevalent issues in the region, there is already work underway to mitigate these trends that could be leveraged and built upon if planned relocation were to be pursued. Salem is considering a new ordinance to control housing prices. Lynn created a housing plan, which has prompted far more aggressive affordable housing policies than previously considered in the city. Everett continues to limit redevelopment in historically residential areas, has secured state and federal grants to provide residents with rental assistance, and has one of the lowest residential tax rates in the state. Chelsea has prioritized property acquisition for new affordable housing in areas at risk of displacement, provides utility and energy efficiency assistance, and has started an anti-displacement task force with community partners. Certainly, these efforts would have to be intensified if there were to be large-scale relocation, but these cities would have some policies and programs as a foundation on which to build.

Municipal Readiness

Given the extent to which planned relocation efforts fall on municipalities, a central line of inquiry in the interviews was whether municipal staff felt prepared to take on that work. The answer was a resounding "no". One interviewee stated, "municipalities are not at all equipped to address this issue on their own." Another reiterated this sentiment: "Municipalities can't do it on their own." Citing financial, political, and capacity issues, there was a unanimous call for more state and federal support before municipalities can even consider implementing planned relocation.

The potential hit to the municipal tax base was a frequently raised financial barrier for municipalities. In Chelsea, most of that tax revenue would be lost through the commercial and industrial sector. Alex Train described the devastating financial impact that would ensue if they faced the need to relocate large swaths of the city: "95% of our commercial and industrial tax base is enveloped by floodplains, so retreating from these areas would fiscally spell disaster for the city, meaning we couldn't deliver services and... could barely maintain a balanced budget." Coming from a perspective outside of city government, John Walkey from GreenRoots expressed deep-seated doubt that municipal governments would even be willing to discuss relocation given the financial implications. He said: "Asking them to talk about the loss of tax revenue from property taxes is like asking them to go without sustenance, so that doesn't come up too much." At this stage, interviewees were more focused on the financial barriers to implementing relocation, rather than potential solutions to reduce the barriers.

Beyond the impact to the tax base, interviewees expressed that they didn't know where funding for relocation would come from. They were clear that municipalities could not be expected to pay for buyouts. One interviewee said, "Cities and towns can't handle that kind of

strain on their budget to buy out homes." Another said: "I can't imagine going to the Council for a bond to buy a house. It's got to come from the federal or state government. Without those types of funds from the federal government and FEMA, I don't see a buyout program going anywhere." For municipalities to be able to implement planned relocation in the future, they will need financial support from the state and federal government, as well as trainings on how to access and take advantage of the funding.

In addition to financial concerns, several interviewees raised concerns around the difficulty of even bringing up the topic of planned relocation. One noted that it is a "very delicate topic," and another remarked, "it's so politically unpalatable that nobody wants to begin." Part of this unpalatability seems to stem from the extent to which the strategy is a departure from past land use decision-making. Accepting the loss of recent development investments is particularly difficult to consider. John Walkey of GreenRoots spoke to this sentiment: "Everything that just got invested in the Seaport District is going to be a total loss and nobody wants to admit that or talk about what are we going to do in terms of retreat from there because we've invested so much." Similar sentiments were shared about areas of recent redevelopment in Everett and Revere.

Capacity of municipalities to lead planning efforts and eventual implementation of relocation was another identified barrier when it comes to municipal readiness. The feeling that municipalities do not have the staff or financial capacity to take this on was shared by many interviewees. In Chelsea, Alex Train explained: "We're a small, chronically under resourced department. Each one of our staff is managing 20 plus projects. They can't be asked to take on something as sizable as that discussion." Darya Mattes of the North Suffolk Office of Sustainability and Resilience expressed particular concern for communities like Winthrop that

have especially small staffs and tax bases. On the flip side, an interviewee commented that cities like Cambridge with far more abundant resources are better equipped to take on the issue.

To better understand implementation barriers beyond financial and staff capacity limitation, each interview included a question about staff readiness to conduct the engagement need to equitably plan for relocation. Given the emotional nature of the topic and the relative novelty of the strategy, many interviewees reported feeling unprepared for that kind of engagement. Part of this was not having the content-specific knowledge, such as what policies could be utilized, what resources are available, and what support exists for municipalities. One interviewee said: "Before we even communicate about this, what are the solutions? How can we help people with that? Can we provide some sort of funding? Or can we provide a location where they can retreat if something happens? I think we have a lot to figure out internally first, before we start putting ideas out there." While planning processes should always include stakeholders in the process of generating solutions, this interviewee felt she needed more knowledge on the topic to even be able to facilitate that discussion.

Others felt more comfortable with the topic itself but said they would need a lot of external support to be ready to approach public engagement. From Chelsea, they report: "We would need vast resources: political strategy, communication support, organizing support. We have the connections and relationships to engage in dialogue, however, given the gravity of the topic, I think it warrants quite a bit of strategic planning before engaging and we're not set up to do that." This feeling was echoed in Lynn: "Coming at these difficult situations requires an understanding of how to approach them to be sensitive to people's emotional connection to place and how history plays into that. More resources are needed to do that well." One outlier in the set of interviewees responded that he felt totally equipped for such discussions because he is not

opposed to dealing with contention. He "speaks Everett," and has experience with framing issues in a way that will get the public on board. While there was some variability in interviewees feeling of preparedness to engage the public on the topic of relocation, the majority felt that significant support was required for them to do it well.

Most see that support coming from the state and federal level, but there was also consensus that community-based organizations would have a role to play in engagement efforts around relocation. Municipal staff felt that community-based organizations would be a critical link to connecting with residents. Staff at GreenRoots supported this idea, assuming they would play a role in supporting community engagement if Chelsea or East Boston were to pursue relocation as a strategy. They saw their role including mobilizing residents, getting people to meetings, and collecting public perspectives. Even beyond engagement, an interviewee suggested that non-profits have a central role to play in strategizing around planned relocation, saying "Waterfront Partners [a coalition of non-profits in Boston] has more leeway to think about this and how to do it equitably without breaking the bank for municipalities because they are all non-profits." Whether by helping municipalities connect with residents or lending strategic support, non-profits and other community organizations will be a key partner in any future relocation planning efforts.

Regional Planning

Experts in the field of coastal adaptation planning have called on the need for regional collaboration given the fact that threats from sea level rise cross jurisdictional boundaries. Given the importance of a regional approach for advancing equitable relocation planning, it is informative to understand the current state of regional collaboration on coastal resilience efforts to see where the gaps and opportunities lie if the area were to pursue planned relocation on a

larger scale. In general, interviewees expressed a desire to tackle the issue regionally and shared many examples of regional initiatives that are already underway.

Of sea level rise, one interviewee said simply, "It's a regional problem, so we have to address it that way." The Chelsea and Everett partnership on the Island End River resiliency project was the largest scale project that brought together multiple municipalities, but there were many examples of regional working groups that could lay the foundation for discussions about relocation in the future. For example, there is a group of planners from Everett, Lynn, Malden, Revere, and Saugus that meet on a bi-weekly basis to discuss coastal resiliency. There is also the newly formed North Suffolk Office of Sustainability & Resilience that represents Chelsea, Revere, and Winthrop. The Mystic River Watershed Association has created the Resilient Mystic Collaborative that is made up of municipal partners looking to leverage state and federal funding to address the adverse effects of climate change on watershed management in the region. Several interviewees pointed to this group as a leading regional force on the issue. Finally, one interviewee mentioned Boston Waterfront Partners—a group of non-profits, including GreenRoots, Boston Harbor Now, and Conservation Law Foundation, that focuses on coastal resiliency and ensuring sustainable planning and development patterns.

While these existing projects and working groups speak to a foundation from which to grow regional coastal resiliency work, interviewees also identified some gaps in the regional planning realm that would need to be strengthened to support relocation planning. First is the need for better coordination across different levels of government. There are several areas at risk from flooding that include state-owned assets, such as the seawall along Lynn Shore Drive. In order to have comprehensive coastal resilience planning efforts, municipalities need to be able to coordinate with state agencies. This ability to coordinate and communicate across multiple

regulatory agencies to approve and permit projects was cited as a barrier to larger regional planning efforts. One interviewee noted the lack of regional planning structures in the state. He felt that the home rule governance structure in Massachusetts means that each municipality is it's "own little kingdom," and that while MAPC exists, it can only affect policy through carrots rather than sticks, limiting its influence. Given this decentralized planning structure, he underscored the importance of groups like the Resilient Mystic Collaborative because they "get people to work together collaboratively and leverage funds for projects that go over the boundaries of the municipalities." There was a shared feeling among interviewees that regional and cross-jurisdictional planning would be an essential feature of planned relocation efforts.

Long-Term Planning

Closely related to the need for regional planning to ensure effective and equitable relocation planning, is the need for long-term, holistic planning that ties coastal resilience goals in with other community priorities. There were mixed responses to the extent to which municipalities have been able to execute on this. Many pointed to climate vulnerability assessments completed through the Municipal Vulnerability Preparedness (MVP) program and Hazard Mitigation Plans as the long-range plans that guide their resilience work. Salem sees the creation of the Sustainability and Resilience Department as a great success for their long-term resilience work. The department was established because the city recognized the extent to which their sustainability planners need to coordinate with other departments to better integrate sustainability into all city operations. According to Esmeralda Bisono, the department is a strong advocate of long-term planning in the city. Given the complex nature of relocation planning and the time it takes to implement relocation effectively, these sorts of long-range planning efforts will need to be continued and added to across the region.

Many cities reported not doing as much long-term planning as they would like and attributed this shortcoming to a wide range of factors. In Lynn, the planning department is very new, so they are only now starting the city's first comprehensive plan. Aaron Clausen of Lynn also remarked that "financial scarcity is a constant pressure in Lynn which has limited its ability to be proactive in planning." The lack of a centralized planning department in Lynn also meant that planning efforts happened in silos. As a result, some areas, including sustainability and resilience, had fallen through the cracks. Clausen expressed optimism that this would change, saying that the goal of the newly established department is to be more intentional about aligning all initiatives to larger city objectives.

In Chelsea, they have also never created a comprehensive plan. Alex Train reflected on why this was: "There's been immeasurable unmet need for so long, so when there are resources available, the first thought is how do we satiate that unmet need." For them, it feels like a choice between directing resources to long-term planning initiatives or meeting immediate needs. Other barriers to long-term planning included trying to get the focus of department heads that are busy with their day-to-day duties and educating the public on the value of long-term climate planning. To this last point, Frank Stringi of Revere noted a tension in how to engage residents in long-term planning: "We don't want to push the panic buttons, but we want them to be educated about the real problems that exist and the risks of the future." Meeting current needs, understanding residents' risk perceptions, and working with scarce financial resources will all be factors to consider in long-term relocation planning efforts.

Interestingly, the perception of municipalities' ability to plan on a longer timescale was even more constricted from an outsider, non-profit perspective. John Walkey of GreenRoots expressed a real lack of confidence that municipalities were capable of proactive planning,

saying: “The municipal folks, they're not paying any attention to this because they live on a quarterly cycle—bring in revenue this quarter, worry about next year's budget, and that's all you worry about. You just hope that the shit doesn't hit the fan while you're still in office, so there's a real short termers kind of mindset.” Given this perception, he sees nonprofits like GreenRoots as critical to bringing a long-term, proactive approach to city planning efforts, especially when it comes to addressing systemic issues. Building relationships between community organizations and municipalities is a critical step in extending planning timescales and building trust in local governments—an idea that is further explored below.

Public Trust in Local Government

The need for high levels of trust between frontline communities and their local governments has been underscored throughout this thesis. Without trust from its constituents, a government is set up for failure in implementing an equitable, community-led process for exploring planned relocation. As such, each interviewee was asked to characterize the level of trust they think the public holds for their local government. The responses varied greatly from community to community, and even showed variation over time within a given community. Interviewees expressed that levels of trust have been affected by who holds elected positions and how they handle crises like the Covid-19 pandemic. Expectations around what local governments can be expected to provide also came up as a factor influencing public trust. Darya Mattes commented: “People expect a lot from local government and are disappointed if it doesn't happen.” She referenced a local study that found that in the case of a natural disaster, most people anticipated they would get the help and information they needed from their local government. Despite the variation, some themes emerged around factors that lead to a lack of trust and factors that show the potential to build trust.

One of the most commonly cited reasons interviewees gave to explain a lack of trust from their residents was past failures of their city government to meet their needs or genuinely listen to their opinions. In Lynn, Aaron Clausen spoke to a failure of the city to properly engage the community before there was a unified planning department. He remarked that "without a planning department, community engagement was only checking boxes," and that there existed the perception that City Hall was "an insular, patriarchal kind of place." Similarly, in Chelsea, Maria Belen Power of GreenRoots explained how residents have grown frustrated with being asked their opinion over and over again without seeing their input implemented. The lack of responsive governance has bred mistrust. Alex Train agreed that residents in Chelsea held great distrust for the government, especially before the pandemic. He remarked: "Before the pandemic, the community wholly distrusted the government and had zero faith in our ability to deliver for residents partially because our residents have faced unspeakable repression in their home countries, as well as not properly served by the city government in Chelsea." John Walkey of GreenRoots, agreed that past harm from local governments has bred distrust and disillusionment, speaking in particular to residents of East Boston and the disproportionate burdens they have carried by living next to the airport.

One the flipside, interviewees were also able to point to progress in building community trust. Transparency, honesty, and effective communication were all identified as essential avenues for building trust. In Lynn, Aaron Clausen reported that with their new mayor in office, "there's been much more effort geared toward transparency in government activities and as long as we continue to do that and we demonstrate that policy and resources are aligned with those plans, I think we'll continue to build that trust." Many acknowledged that building trust is a gradual process that needs consistent work year after year. Tom Philbin of Everett said: "Trust,

you have to work on it every day and you have to be honest and open and communicate effectively with the public." All interviewees expressed the desire to continue working to build trust.

In addition to transparency and communication, interviewees spoke to the power of tangible results—essentially the notion that actions speak louder than words when it comes to building trust. Interviewees in both Everett and Revere spoke to their past climate resilience work as reasons for resident trust in that area. Based on past work, Erik Swanson of Everett reported that "in general, they're supportive and trust what we're doing as the city in terms of protecting them from climate change." In Revere, Frank Stringi remarked that "the positive things we're doing breeds that trust." In Chelsea, great strides were made in building public trust through the city's response to the Covid-19 pandemic. Alex Train described the response as the "first occasion of significance where we were able to demonstrably connect with residents by providing a range of services to mitigate the impacts of Covid-19 and coordinate at the executive level across multiple organizations and agencies." Finally, multiple interviewees spoke to the invaluable power of partnering with regional groups, non-profits, and community organizations in establishing trust with residents. These wins will all enhance the ability of these communities to engage residents in difficult discussions about relocation that are grounded in trust.

Resident Reactions to Buyouts

Finally, in order to explore the current palatability of relocation discussions in Massachusetts, interviewees were asked how they think residents would react to proposals for more widespread buyouts under the scenario that it was 2070 and threats from sea level rise and storm surge had intensified well beyond the current levels. While all responses are purely speculative, they illustrate what planners believe they would encounter in terms of the public's

reaction. More than any other question in the interviews, the responses to this question varied wildly, which could be a result of the speculative nature of the question rather than real variation from community to community.

There were a handful of responses that predicted favorable, or at least indifferent, reactions from residents. One participant highlighted the voluntary nature of buyouts as a selling point: “I could see people being in favor of it because you're paying the owners of the property and they can decide where they want to go. We're not forcing anyone to do anything.” Another reflected on the transient character of much of the region’s population and speculated that residents would be open to relocating: “When we're talking to community members, there's a chunk of folks who are just like ‘well, if I gotta move, I gotta move,’ because they're moving now anyways.” This participant called out immigrants particularly, noting that if they were open to moving across country borders, moving a few towns inland may not feel like a big hardship. Others predicted that by 2070, residents would be not just willing to move, but desperate to move. One said, “I really hope that happens before 2070. That would be too late.” Another remarked, “Folks would be desperate to get bought out.”

Others predicted more oppositional reactions. One said simply, “I think they wouldn’t be thrilled.” A common sentiment was that residents would be surprised or fearful about the proposal for buyouts because they don’t spend much time thinking about sea level rise or flooding. Along those lines, one interviewee said, “I think this whole topic would be a little bit of a shock because I don't think a lot of people are talking about it.” Another corroborated this idea: “For the communities that are at risk for flooding, I don't think it's really sunk in that it's so bad that they're going to get moved out.” That being said, others said just the opposite: “I think they will have already thought about it, and they will want to get as much money as they can.”

Similarly: “I think the general public will be aware that this is something that has to be dealt with and they will either do it on their own or the city will have to step in and educate them on the whole process.” Another spoke to fear stemming from the potential outcomes of the buyout process: “Once that process starts, people are going to be freaking out because there will be fear that certain people will get bailed out and certain others will not.” Clearly, there is a lack of consensus about how planners expect residents to respond.

Perhaps the most insightful and actionable responses from this question were those that were conditional on how a buyout program is implemented. For example, one interviewee predicted that resident reactions would depend on whether there had been proactive, pre-disaster planning efforts before offering buyouts. He said: “There needs to be more pre-disaster planning to think really intentionally about this. Unless we change that, I think it would not be a very positive discussion.” Another placed a condition on financial assistance offered to those facing relocation: “If it's simply just the acquisition of existing property that would entail absolutely no safety net or assistance for tenants, it would prompt widespread opposition, and it would irreparably harm residents. If there are economic provisions in place, there may be more room for constructive dialogue.” Other conditions included the accessibility of the buyout program and a reasonable timeline for completing the transaction. Despite the great variation in responses—or perhaps because of—interviewees showed an understanding of the complexity of planning for relocation and anticipate strong reactions from residents if and when their cities decide to pursue relocation as a coastal adaptation strategy.

Conclusion

As stated in the introduction, this thesis set out to discover opportunities to integrate relocation planning into coastal resilience planning efforts in a way that prioritizes equitable outcomes for environmental justice populations. By and large, the interviewees agreed with my underlying assumption that relocation is something that will have to be seriously considered in the coming decades. However, these municipal planners currently feel unprepared to take on the required engagement and planning. This admission of a lack of preparedness was almost encouraging to me—it showed the extent to which my interviewees understood the vast challenges to implementing planned relocation. Many cited equity concerns as a reason they were not ready to engage in relocation planning. This demonstrated a real commitment to prioritizing equity.

Beyond equity-based barriers, however, there was also a clear gap in knowledge or experience around planning for relocation. During the interviewee recruitment stage of the project, I reached out to several planners in the area who declined to be interviewed, stating they did not know enough about the topic to want to be interviewed. Those who agreed to be interviewed may be a skewed sample—perhaps they have a personal interest in relocation planning or a stronger commitment to environmental justice that made them more interested in having a conversation with me. Overall, my experience recruiting interviewees and talking to planners left me with the ultimate takeaway that significant work is needed in the region to build municipal capacity to take on the topic of planned relocation. I will conclude the thesis with a set of Massachusetts-based recommendations to build stronger opportunities to consider relocation in a way that prioritizes equitable outcomes for all.

Recommendations

1. **Strengthen regional collaboration on coastal resilience efforts**.

As revealed through the interviews, the Greater Boston area is particularly confined when it comes to relocation options due to its dense, built-out nature and its booming housing market. This reality means relocation away from flood risks within a single municipality is especially difficult due to lack of undeveloped land or available affordable housing. As such, regional collaboration is especially important for the area. Although it lacks regulatory authority, the Metropolitan Area Planning Council could serve as a convener of municipalities within its region to start looking at the issue of relocation at a larger geographic scale**.** Existing regional partnerships among municipalities and non-profits could grow under larger-scale regional leadership. The Cape Cod Commission—arguably the Commonwealth's strongest regional planning agency—is a strong model of providing support for innovative and regional coastal resilience strategies.

Stronger regional leadership will help address the capacity issues cited by small and under resourced municipalities. It will also provide a structure through which to mitigate unequal tax base implications for different municipalities. For example, a regional planning scale would facilitate creating cross-jurisdictional solutions that take differing financial impacts into account, such as Transfer of Development Rights or rolling easements that span multiple cities and towns. Without regional leadership, fully built-out coastal communities are stuck between a wave and a wet place.

2. **Operate under longer term planning horizons.**

By and large, my interviews suggested that municipal governments in the area are not actively thinking about relocation as a strategy. For many, it feels radical, and even

unnecessary. While current sea levels may not necessitate relocation, projected future levels may. Expanding planning horizons to look out decades rather than years would enable municipalities to lay the groundwork for equitable relocation in the decades to come through policy choices they make today. This would allow for the shift from reactive to proactive relocation planning, which was identified in the literature as a critical step in facilitating equitable relocation. A longer planning horizon would allow planners to do more comprehensive life-cycle cost analyses of different coastal resilience solutions. Such analysis may better demonstrate the long-term protection benefits and eventual cost-savings delivered by proactive relocation over hardening shorelines and repetitively rebuilding damaged infrastructure. Additionally, starting a conversation with the public about relocating in ten or twenty years is far more palatable than suggesting policies or programs that would encourage immediate relocation. I see longer planning horizons that include the public early on as a key way to gain buy in, prioritize equity, and prepare providers of critical services for eventual relocation.

3. Prime the public for relocation with strategic messaging.

While my interviewees' speculations about how the public might respond to buyouts cannot be taken as a proxy for true public opinion, it at least demonstrates municipal planners' concerns that the public will not be supportive of relocation. The literature also suggested that oppositional responses from the public are to be expected, especially if messaging about relocation is not done in a thoughtful and strategic manner. As such, I think there is plenty of work that can be done today to start reframing relocation as a powerful solution, so the public is mentally and emotionally primed to consider relocation when the necessity arises. A simple step that any municipality could implement is to begin presenting

relocation as one of many options to consider when discussing coastal adaptation strategies with the public. By presenting relocation as an option—and being transparent about the costs and benefits of such a strategy—, planners can start to normalize talking about relocation, gain experience talking to the public about the strategy, and begin to gauge the public's attitude towards it. In addition to presenting relocation as an option during traditional planning efforts, non-profits, media outlets, libraries, artists, musicians, and others could weave relocation into their work and support visioning processes as a way to broach the topic with the public. Approaching the topic from different angles and creative mediums will help the public begin wrestling with the idea of relocation before the need is urgently knocking at their door.

4. Consider relocation policy techniques that can be implemented now.

As discussed in the literature review, many relocation techniques (most notably, property buyouts) are reactionary solutions. Not only does the risk avoidance come too late, but the implementation is complicated by politics and emotions that arise in the face of disasters. Therefore, I see a great opportunity for Massachusetts to begin implementing relocation policy techniques today that will lay the groundwork for gradual relocation in the future. Techniques, such as rolling easements, Transfer of Development Rights, and regulatory tools that rely on a trigger event (e.g., hitting a certain high tide line) can be implemented proactively. The impact of such tools would grow as sea level rise worsened. Because the implications are smaller at first, we are in a window of opportunity for implementing such tools. It will be much easier to communicate to a homeowner about the need to relocate if there has been a policy in place that transparently communicates to residents that relocation

will be necessary once tides reach a certain level. They will have time to prepare financially and emotionally.

Given the development pressures discussed in my interview findings, the region is also at a critical moment for implementing policy to restrict development in at risk areas. It is one thing to not be considering relocation yet, but to be allowing development that is intensifying flood risks is entirely foolhardy. Municipalities must start now to update zoning codes to prohibit new development in floodplains. They should also be thinking strategically about coastal properties they can begin to acquire or protect in perpetuity to serve as long term flood protection. The earlier this work begins, the easier and more effective implementation will be.

5. Embed capacity-building for municipalities into the proposed Massachusetts Flood Risk Protection Program.

As clearly shown through the interviews, planners in Massachusetts do not feel prepared to take on the task of planning for relocation and engaging the public about the topic. State and federal support is sorely needed to reduce the burden on municipalities and to build their capacity for taking on the issue. A promising opportunity through which to do this in Massachusetts is through the proposed Flood Risk Protection Program (see the Massachusetts Coastal Resilience Review section for details). While the program already proposes conducting state-wide flood risk assessments in order to prioritize areas for property buyouts, it could go further to support municipalities by including trainings that would prepare planners to engage residents within their borders on the topic in an inclusive and empathetic manner. This would need to include sharing strategies for facilitating community-led processes and conducting culturally and emotionally sensitive planning sessions. Given the extent to which my interviewees raised concerns over relocation outcomes for renters and non-English speakers,

trainings should share strategies to ensure those populations are not left behind. By including rigorous trainings, this program could go beyond a state buyout program to be a mechanism to share knowledge and resources with communities across the Commonwealth.

Further Research & Closing Thoughts

While there are starting to be more real-world examples of relocation to learn from, the approach has not been implemented or researched as much as many other adaptation strategies. As such, the field would benefit from additional research and an openness to innovation. Expert A.R. Siders summarizes this need well: "Future retreat will need to be engaged with a spirt of experimentation: a willingness to try new things paired with rigorous research and evaluation of progress and outcomes for all affected." While the literature I reviewed was full of suggestions for further research, I will focus on needs for further research that arose through my own interviews.

First and foremost, my research tackled the topic of relocation from the perspective of municipal planners in a small region in just one state. This narrow look at the issue invites continuation of this work that broadens the set of perspectives on the issue. While I asked planners to speculate about the reactions of the public to planned relocation, the public's attitudes are not reflected in this thesis. It would be informative to pursue a similar project targeting residents rather than municipal staff members. Specifically, I would be curious to learn to what extent the public is thinking about relocation as an option and how willing they would be to consider it in the future. The views of the public would uncover a needed piece of the relocation puzzle and allow for more informed implementation of relocation strategies. Additionally, because my thesis was specifically focused on areas with high concentrations of Environmental Justice populations, my interview findings may be skewed by speaking with

planners that are more tuned into the needs of EJ populations than typical planners. As such, it would be beneficial to complete a similar investigation in communities with a lower concentration of EJ populations to understand how those less familiar with common equity issues might be thinking about relocation differently than the planners I spoke with.

Beyond the targeted research group, there is also a need for improved data collection on where people are already relocating to and how they are faring economically, socially, and psychologically to better understand the potential impacts of relocation programs. In Massachusetts, for example, there is little data about where people displaced from the coast are moving. Are they simply moving further inland in their own community, or are they moving to entirely new cities, or even states? This information could provide insights into what relocation patterns to avoid or encourage based on the outcomes of residents that have already moved for one reason or another. Only with this data will practitioners have the information they need to push forward equity-focused solutions on how to approach relocation proceedings.

Advancing such research will require involving universities and grant agencies, forming researcher-practitioner partnerships, and creating global networks of organizations committed to sharing research and best practices on the subject. This work is beginning. Groups such as the Climigration Network are bringing together academics, policy makers, and practitioners to push this work forward. Based on the conversations I had both formally and informally as part of this thesis, I am optimistic that this work will continue. With a deep commitment to prioritizing equity and community involvement at every stage of the process, I believe relocation has the potential to be a powerful tool for advancing long term coastal resilience.

References

Ajibade, I. J., & Siders, A. R. (2021). *Global Views on Climate Relocation and Social Justice* (1st ed.). Routledge. https://doi.org/10.4324/9781003141457.

"An Act Establishing a Massachusetts Flood Risk Protection Program." (2021). The Trustees. https://thetrustees.org/wp-content/uploads/2021/06/FRPP-Fact-Sheet-June-2021.pdf.

Bagri, Neha Thirani. (2017). "The US is Relocating an Entire Town Because of Climate Change. And This is Just the Beginning." Quartz. https://qz.com/994459/the-us-is-relocating-an-entire-town-because-of-climate-change-and-this-is-just-the-beginning/.

"Brief History of EEA." (n.d.). Massachusetts Executive Office of Energy and Environmental Affairs. https://www.mass.gov/service-details/brief-history-of-eea.

Bronen, Rachel. (2010). "Forced Migration of Alaskan Indigenous Communities Due to Climate Change." University of Alaska, Resilience and Adaptation Program. https://www.researchgate.net/publication/278649977_Forced_Migration_of_Alaskan_Indigenous_Communities_Due_to_Climate_Change.

Carey, John. (2020). "Core Concept: Managed Retreat Increasingly Seen as Necessary in Response to Climate Change's Fury." Proceedings of the National Academy of Sciences of the United States of America. https://www.pnas.org/content/117/24/13182.

"Climate Ready Boston." (2016). City of Boston. https://www.boston.gov/sites/default/files/file/2019/12/02_20161206_executivesummary_digital.pdf.

Climigration Network. (2021). "Lead with Listening: A Guidebook for Community Conversations on Climate Migration." https://static1.squarespace.com/static/580df9afe4fcb5fdf27a053a/t/60f02f35a9bc231ac1d16416/1626353465637/LeadwithListening_ClimigrationNetwork_20210715.pdf.

D. Reidmiller, C.W. Avery, D.R. Easterling, K.E. Kunkel, K. Lewis, T.K. Maycock, B.C. Stewart (Eds.), Impacts, Risks, and Adaptation in the United States: The Fourth National Climate Assessment, Vol. II, U.S. Global Change Research Program (2018), pp. 33-71.

Doberstein, Brent, Patrick Sauders-Hastings, Michael Bernard, and John Somerville. (2020). *Planned Retreat Approaches to Support Building Long-Term Climate Resilience* [Webinar]. Climigration Network. https://www.climigration.org/learning-sessions-1.

Favelle, Christopher. (2021). "Climate Change is Bankrupting America's Small Towns." The New York Times. https://www.nytimes.com/2021/09/02/climate/climate-towns-bankruptcy.html.

"The First National Flood Risk Assessment." (2020). First Street Foundation. https://assets.firststreet.org/uploads/2020/06/first_street_foundation__first_national_flood_risk_assessment.pdf.

Flavelle, Christopher. (2021). "The Cost of Insuring Expensive Waterfront Homes Is About to Skyrocket." The New York Times. https://www.nytimes.com/2021/09/24/climate/federal-flood-insurance-cost.html?referringSource=articleShare.

French, Kristen. (2021). "What is needed for Fair and Equitable Managed Retreat?" Columbia Climate School. https://news.climate.columbia.edu/2021/07/01/what-is-needed-for-fair-and-equitable-managed-retreat/.

"FY21 Completed Action Grant Summaries." (2021). MA Executive Office of Energy and Environmental Affairs. https://www.mass.gov/doc/fy21-mvp-action-grant-completed-project-summary-slide-deck/download.

Georgetown Climate Center. (n.d.) "Managed Retreat Toolkit." https://www.georgetownclimate.org/adaptation/toolkits/managed-retreat-toolkit/introduction.html.

Gout, Elise. (2021). "Are Buyouts a Viable Tool for Climate Adaptation?" Columbia Climate School. https://news.climate.columbia.edu/2021/06/29/are-buyouts-a-viable-tool-for-climate-adaptation/.

Hardy, R. D., Milligan, R. A., & Heynen, N. (2017). "Racial Coastal Formation: The Environmental Injustice of Colorblind Adaptation Planning for Sea-Level Rise." *Geoforum; Journal of Physical, Human, and Regional Geosciences*, *87*, 62-72. https://doi.org/10.1016/j.geoforum.2017.10.005

"Introduction to the National Flood Insurance Program (NFIP)." (2021). Congressional Research Service. https://sgp.fas.org/crs/homesec/R44593.pdf.

"Investing in Resilience." (2019). Center for Climate and Energy Solutions. https://www.c2es.org/wp-content/uploads/2019/11/investing-in-resilience_Brief.pdf.

IPCC. (2018). "Summary for Policymakers." In: *Global Warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty.* [Masson-Delmotte, V., P. Zhai, H.-O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani, W. Moufouma-Okia, C. Péan, R. Pidcock, S. Connors, J.B.R. Matthews, Y. Chen, X. Zhou, M.I. Gomis, E. Lonnoy, T. Maycock, M. Tignor, and T. Waterfield (eds.)]. *World Meteorological Organization, Geneva, Switzerland, 32 pp.*

Isacoff, Rachel (2021). "Identity and Power: How Cultural Values Inform Decision-Making in Climate-based Relocation." In A.R. Sider & Idowu Jola Ajibade (Eds.), *Global Views of Climate Relocation and Social Justice* (1st ed., pp.194-208). Routledge.

Kath, Ryan and Jim Haddadin (2020). "Rising Seas: Time for Mass. Towns to Retreat from the Coast?" NBC Boston. https://www.nbcboston.com/investigations/rising-seas-time-for-mass-towns-to-retreat-from-the-coast/2254541/.

Leiserowitz, Anthony, et al. (2021). "Climate Change in the American Mind." Yale Project on Climate Change Communication, George Mason University's Center for Climate Change Communication. https://climatecommunication.yale.edu/publications/climate-change-in-the-american-mind-march-2021/.

Leonard, K. (2021). "WAMPUM Adaptation Framework: Eastern Coastal Tribal Nations and Sea Level Rise Impacts on Water Security." *Climate and Development*, *13*(9), 842–851. https://doi.org/10.1080/17565529.2020.1862739.

Marcell, Kristen, Nava Tabak, Bill Nechamen, and Bennett Brooks. (2020). *Making it Personal: Getting Vulnerable Neighborhoods to Talk about Long-Term Flood Risk* [Webinar]. Climigration Network. https://www.climigration.org/learning-sessions-1.

"Massachusetts Office of Coastal Zone Management." (n.d.) Mass.gov. https://www.mass.gov/orgs/massachusetts-office-of-coastal-zone-management.

Morris, Deborah Helaine (2021). "The Climate Crisis is a Housing Crisis: Without Growth We Cannot Retreat." In A.R. Sider & Idowu Jola Ajibade (Eds.), *Global Views of Climate Relocation and Social Justice* (1st ed., pp.142-151). Routledge.

Moser, Susanne C. (2021). "Waves of Grief and Anger: Communicating through the 'End of the World' as We Know It." In A.R. Sider & Idowu Jola Ajibade (Eds.), *Global Views of Climate Relocation and Social Justice* (1st ed., pp. 273-288). Routledge.

Mulkern, Anne C. (2021). "For Rent: California Houses Endangered by Rising Seas." ClimateWire. https://www.eenews.net/articles/for-rent-calif-houses-endangered-by-rising-seas/.

"Newtok Planning Group." (2019). Alaska.gov. Department of Commerce, Community, and Economic Development. https://www.commerce.alaska.gov/web/dcra/PlanningLandManagement/NewtokPlanningGroup/RelocationNews.aspx.

"Peggotty Beach Retreat Feasibility Study." (2020). Metropolitan Area Planning Council. https://www.scituatema.gov/sites/g/files/vyhlif3781/f/pages/peggotty_beach_feasibility_study_final.pdf.

Pilkey, Orrin, Sarah Lipuma, and Norma Longo (2021). "Retreating From the Waves." In A.R. Sider & Idowu Jola Ajibade (Eds.), *Global Views of Climate Relocation and Social Justice* (1st ed., pp.247-262). Routledge.

Rios, Simon. (2018). "Entrench or Retreat? That is the Question on Plum Island." WBUR. https://www.wbur.org/news/2018/08/02/plum-island-climate-change-entrench-retreat.

Siders, A.R. (2022). "Managed Retreat Introduction for Rockport, MA." https://www.youtube.com/watch?v=LS-DEunQ0Ww.

Siders, A. R. (2019). "Managed Retreat in the United States." *One Earth*, *1*(2), 216–225. https://doi.org/10.1016/j.oneear.2019.09.008.

Siders, A. R. (2019). "Social Justice Implications of US Managed Retreat Buyout Programs." Climatic Change, 152(2), 239–257. https://doi.org/10.1007/s10584-018-2272-5.

Siders, A.R. & Hino, Miyuki & Mach, Katharine. (2019). "The Case for Strategic and Managed Climate Retreat." Science. 365. 761-763.

Tsang, Maggie, and Isaac Stein. (2021). "Losing Ground: Rethinking Land Loss in the Context of Managed Retreat." In A.R. Sider & Idowu Jola Ajibade (Eds.), *Global Views of Climate Relocation and Social Justice* (1st ed., pp. 78-87). Routledge.

Appendices

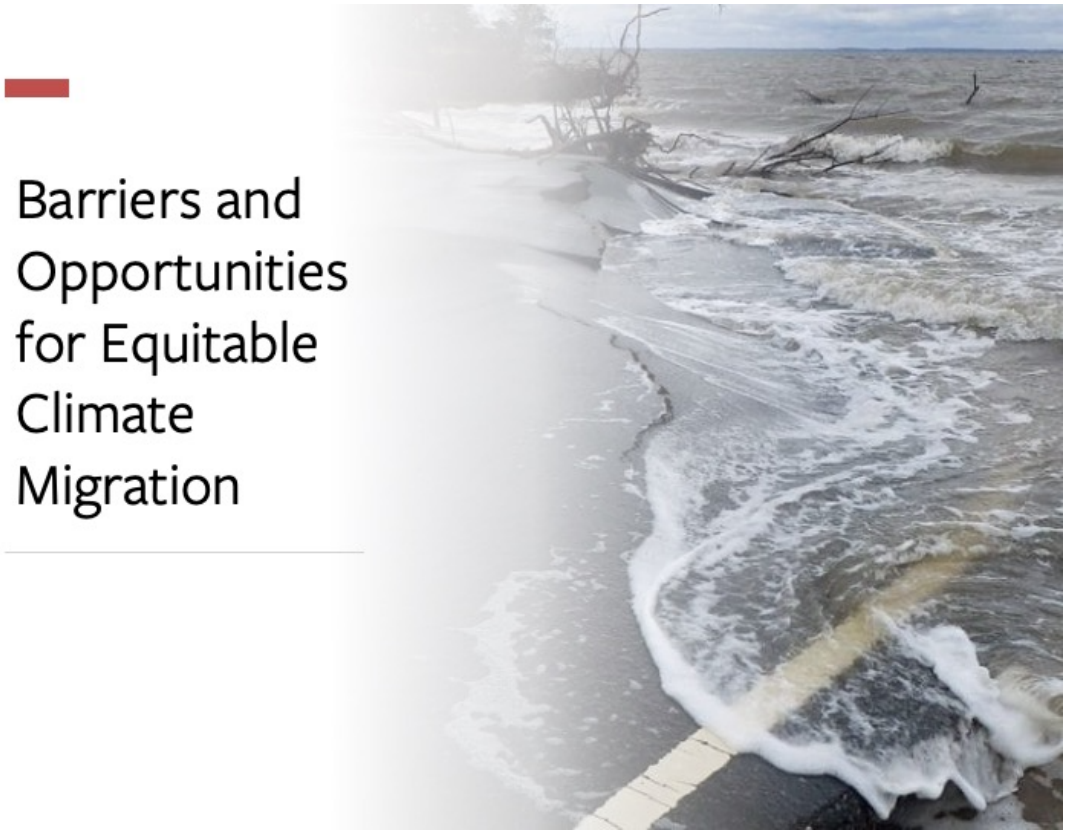
Appendix I: Interview Protocol

<table>
<tr><td colspan="2">Introduce myself and the basics of my project:
• Master's thesis through Tufts Urban and Environmental Policy and Planning Department
• Looking to understand the current barriers and opportunities for incorporating relocation away areas at risk from sea level rise and flooding into coastal adaptation planning in Massachusetts
• Especially interested in how to prioritize equitable outcomes for all members of a community
• Explain the flow of the interview and that there is no need to have already engaged in these topics in order to participate in the interview</td></tr>
<tr><td>Introductory</td><td>• Can you tell me briefly about your role in [CITY]?
• How does your role connect to climate resilience initiatives—particularly coastal adaptation and flood mitigation?</td></tr>
<tr><td>Understanding their experiences to-date</td><td>• Who/what areas are currently most impacted by flooding in your community?
• How does vulnerability to flooding overlap with other kinds of vulnerabilities? Housing security? Income? Others?
• Has [CITY] faced displacement issues in the past? How has the City addressed the issues? Regional work in this area?
• Can you tell me about a time when your department/organization engaged the community in a highly contentious or emotional topic?
o How did you approach it?
o How did the public react?
o What do you think could have gone better?
• Have you ever talked about retreat/relocation as an adaptation strategy in [CITY]? To what extent?
o How was it received?
o What were the most convincing arguments advocating for or against it?</td></tr>
<tr><td>Brief presentation</td><td>After the initial questions, I will explain that I am going to give a brief explanation about the research I have done on the barriers and opportunities for advancing equitable climate migration. The presentation will allow my interviewee and I to have a shared understanding of what I mean by equitable climate migration and allow us to discuss the topic in a more hypothetical manner. Below is a general outline of my presentation:
• Define climate migration/managed retreat
• Present barriers to equitable relocation
o General: lack of holistic planning, lack of focus on resettlement and receiving communities
o Emotional: Loss of place/identity, trauma
o Financial: Drain on local tax base, subsidized flood insurance policies disincentivize relocation</td></tr>
</table>

	○ Institutional: reactionary because funding is triggered by disasters, high municipal burden, buyouts take years ○ Equity: Marginalized populations living in most at-risk areas, buyouts favor wealthy homeowners • Present emerging best practices ○ Pre-disaster planning and implementation ○ Connect to other community goals ○ Address historic injustices with reparative action ○ Community-led processes ○ Empathetic, trauma-informed engagement ○ Training and supports for municipalities
Hypothetical and more targeted questions	Emphasize that these questions are more hypothetical and it is fine to not have an answer. They will not be held to anything they say—I am just trying to better understand the MA landscape. • Imagine its 2070 and sea level rise and flooding has become a much bigger threat than it is today. For the first time, your city has decided relocation is a necessary strategy to pursue to protect people and infrastructure. ○ How do you think the public would respond to a proposal for widespread property buyouts? ○ Who might be overlooked in the planning process? ○ As a planner, what infrastructure would you me most worried about protecting? • Adaptation to SLR is all about choices over what gets protected/relocated. What processes does your city currently use to make decisions about making resilience investments? ○ Any precedent that might inform how you would weigh whether to reinforce/protect or relocate infrastructure? ○ Does [CITY] have any precedent for valuing non-monetary factors (e.g. connection to place, proximity to employment, etc.) in planning decisions? ○ How is feedback from the public incorporated into planning processes? • The current relocation processes are reactionary (e.g. federal funding that only becomes available AFTER a disaster). Do you have any examples of your city taking a more proactive approach to a large-scale issue? What barriers or opportunities are there for being more proactive about relocation at the local level? • Experts are calling for the need for better relationships of trust between frontline communities and governments. ○ How would you describe your community's current level of trust in the local government? State?

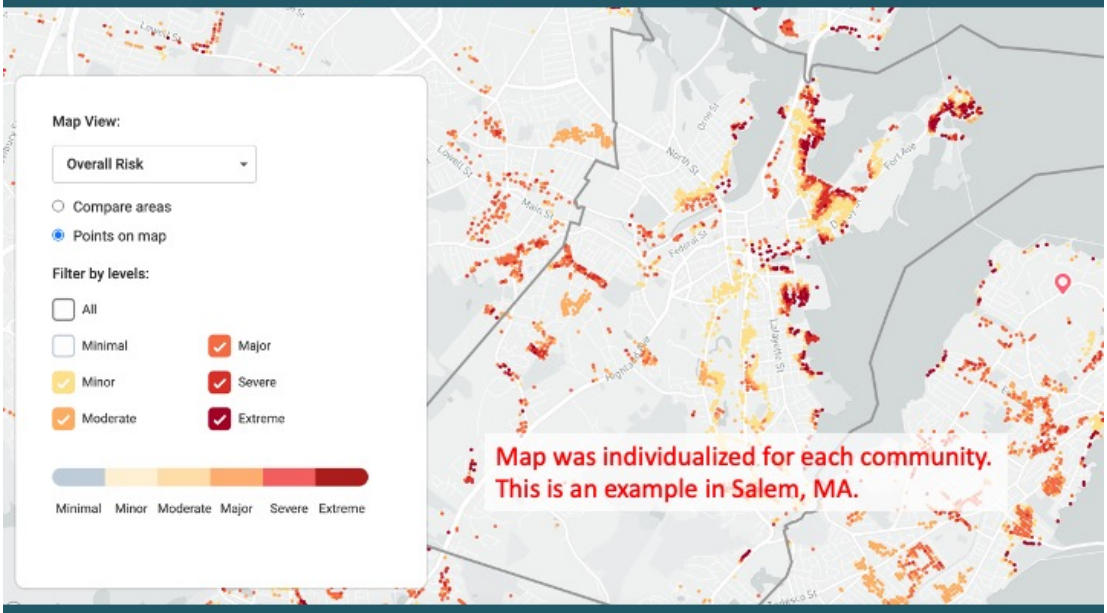
	Federal? Can you point to examples that inform your response? ○ Are there organizations or methods you could call on to forge deeper connections with those you are trying to engage in conversations about relocation? • Experts on this topic are calling for emotionally and culturally sensitive engagement when talking to the public about relocation options. Do you as a planner feel you have the training or support you would need to approach these difficult conversations? ○ What additional support would you need? (e.g. trauma specialists, grief counselors, respected elders, trusted community partners) • Anything else you want to add?

Appendix II: Interview Presentation Slides



Flood Risk in [TOWN/CITY]

[X] properties in [TOWN/CITY] have greater than a 26% chance of being severely affected by flooding in the next 30 years.



Maps and data pulled from FloodFactor (a tool created by First Street Foundation)

Definitions

Climate Migration

Managed Retreat

Planned Relocation

"The purposeful, coordinated movement of people and assets out of harm's way"
– A.R. Siders

Barriers to Equitable Relocation

Emotional/ Cultural	• Loss of place/identity • Trauma
Financial	• Loss of local tax base • Disincentivized by subsidized flood insurance
Institutional	• Reactionary funding • High municipal burden • Buyouts take years
Equity	• Buyouts favor wealthy homeowners • Marginalized populations often most at risk

Opportunities

- Community-led processes
- Empathetic, trauma-informed engagement
- Holistic planning, connected to other community goals
- Pre-disaster planning and implementation
- Greater focus on resettlement
- Address historic injustices with reparative action
- Training and support for municipalities