

People on the Move in a Changing Climate Great Lakes Workshop Report

March 6, 2023

Compiled By:

Kathy Bunting-Howarth, NY Sea Grant

Andrea Harder, University at Buffalo

Nate Drag, NY Sea Grant

Stuart Carlton, IL-IN Sea Grant

Natalie Chin, WI Sea Grant

Kristen Fussell, OH Sea Grant

Sean Rafferty, PA Sea Grant



The shoreline of Lake Superior at Duluth, Minnesota with Canal Park in the foreground, a Baymouth sandbar that separates Lake Superior from the Port of Duluth-Superior. August 2019. *Image credit: University of Minnesota Duluth*



**PEOPLE
ON THE
MOVE IN A
CHANGING
CLIMATE**



People on the Move in a Changing Climate

www.nyseagrant.org

Table of Contents

Acknowledgements	3
Report Introduction	4
Project Description.....	4
Setting the Stage	4
Expert Panels	5
Great Lakes Case Studies	5
Climate Risks and Impacts on Underserved, Under-resourced, and BIPOC Communities	8
Needs of Receiving Communities	10
Notes from the Field: Experiences of Planners, Policy Makers, Teachers, Social Workers, and Others Engaged in Assisting Migrants	13
Current State and Future Needs for Research, Policy and Outreach/ Education	16
Process	16
Research Breakout Summary	16
Policy Breakout Summary	18
Education/Outreach Breakout Summary.....	20
Summary	22
Appendixes	23
Appendix A: Participants	23
Appendix B:Agenda	25
Appendix C: PowerPoint Presentations	28
Appendix D: Case Studies Panel and Breakout Notes	125
Appendix E: Climate Risks and Impacts on Underserved, Under-resourced and BIPOC Communities Panel and Breakout Notes	131
Appendix F: Needs of Receiving Communities Panel and Breakout Notes	136
Appendix G: Research Notes	144
Appendix H: Education and Outreach Notes	150
Appendix I: Policy Notes	157
Appendix J: The Great Lakes and Climate-Induced Migration PEMOCC Fact Sheet	164

Acknowledgements

The Workshop Steering Committee, Kathy Bunting-Howarth, Nate Drag, Stuart Carlton, Kristin Fussell and Sean Rafferty would like to thank participants for sharing their knowledge, experiences and best ideas on the challenging topic of climate-induced human migration. We'd also like to thank our colleagues who assisted in identifying key participants and agenda design (Natalie Chin and Chiara Zuccarino-Crowe) and in the facilitation of workshop sessions (Mary Austerman, Natalie Chin, Megan Kocher, and Chiara Zucharrino-Crowe). In addition, University at Buffalo graduate student, Andrea Harder authored the workshop fact sheet, assisted in notetaking and the compilation of this workshop report.

Funded by the National Science Foundation (NSF), under Grant No, 1940082, **PE**ople on the **MO**ve in a **C**hanging **C**limate (PEMOCC) is a Sea Grant-led Research Coordination Network (RCN) that fosters collaboration among diverse experts and stakeholders to address research needs related to climate-induced human mobility, its socioeconomic consequences, and its role in building resilience and adaptation to the impacts of climate change in US coastal and Great Lakes regions.

The opinions, findings, and conclusions or recommendations expressed in this document are those expressed by participants in the meeting and do not necessarily reflect the views of the National Science Foundation or Sea Grant.

Citations to this report should be: Bunting-Howarth, K.E., Harder, A., Drag, N., Carlton, S., Chin, N., Fussell, K. & Rafferty, S. "People on the Move in a Changing Climate Great Lakes Workshop Report," 1-3 June 2022 (2023).



Lake Ontario's eastern shoreline. *Image credit: Roy Widrig, New York Sea Grant*

Report Introduction

This report is designed to provide an overview of the talks, panels and breakout sessions. Presentations were graciously made available for sharing. In addition, workshop participants specifically requested that the report include raw notes. The appendices include all of this rich information.

Project Description

Changing atmospheric conditions and environmental processes will continue to impact the habitability of coastal communities throughout the United States. By the end of the century upwards of 13 million U.S. residents could be displaced as a result of sea level rise. Despite increased reference to the link between climate change and human mobility (which includes displacement, migration, and planned relocation), there is a lack of knowledge regarding how climate-induced population shifts will impact both sending and receiving communities, what will be required to adapt to those impacts, and how we can ensure the resilience of our communities.

PEople on the MOve in a Changing Climate (PEMOCC) was funded by the National Science Foundation (NSF) to highlight the current state of knowledge on climate-induced human migration, provide the scientific infrastructure that is required to conduct place-based research, and develop context-specific strategies and solutions in collaboration with coastal stakeholders. In order to facilitate trans-disciplinary collaborations among researchers, practitioners, resource managers, and coastal stakeholders, PEMOCC is establishing a Research Coordination Network (RCN) by leveraging Sea Grant's trusted and long-standing relationships with coastal communities. Sea Grant is a nationwide network of 34 university-based programs working with coastal communities through the National Oceanic Atmospheric Administration (NOAA) to promote better understanding, conservation, and use of America's coastal resources. PEMOCC will host five regional as well as an international workshop over the course of three years. Regional workshops in the Northeast mid-Atlantic, Great Lakes, Southwest, Northwest, and Alaska will highlight the current state of knowledge on climate-induced human mobility, provide local and regional case studies, and address the unique needs of the underserved and underrepresented coastal communities. More information can be found at the PEMOCC website <https://www.pemocc.org/>

The Great Lakes regional workshop, hosted by New York Sea Grant, in partnership with Illinois-Indiana, Ohio, and Pennsylvania Sea Grant programs, and held in Buffalo, NY June 1-3, 2022, included participants from every Great Lake state. The Great Lakes region is often described as a future climate destination due to its northeastern and midwestern location, abundance of freshwater resources, and room to accommodate growth following post-industrial population declines. Thus, policymakers, researchers, educators, and experts from various backgrounds gathered to discuss the unique climate migration-related opportunities and challenges that are anticipated in the region. Outcomes of the regional meeting included data and research gap analyses, strategies for education and engagement, and the development of a network of experts and coastal stakeholders that are engaged in the study of climate-induced human mobility and are committed to building community resilience. This report summarizes the presentations, panel discussions, and breakout sessions that occurred during the Great Lakes regional workshop.

Setting the Stage

The meeting commenced with a presentation to ground participants in the region. Rachel Havrelock, English professor and founder of the Freshwater Lab at the University of Illinois at Chicago led a water-focused discussion to set the stage for the Great Lakes regional workshop on climate migration. According to Havrelock, changing hydrological processes and patterns are impacting the distribution of freshwater resources across the globe which is, in turn, driving human mobility. Havrelock suggests that water-driven migration into the region could spur economic development providing an opportunity to rebrand the rust belt as the water belt given an abundance of accessible freshwater supplied by the Great Lakes. Cities like Detroit, Rochester, Buffalo, and Milwaukee could see a renaissance as their infrastructure is put to good use. However, securing affordable, accessible, and quality drinking water in the face of privatization of freshwater resources remains a challenge, now and in the foreseeable future.

Havrelock argued for the deprivatization of freshwater resources, the creation of municipal-owned beverage companies, and the reclamation of revenue streams from private companies that are making billions of dollars off of the bottling and resale of water. Havrelock also advocates for the recycling and reuse of wastewater that can help in creating healthy interdependencies between urban and rural communities. In an economy that has been based on extraction and single use, Havrelock emphasizes the importance of water reuse. She suggests that there is an opportunity to mine phosphorus and nitrogen from wastewater, improve water quality, and reduce surface runoff through the investment of green infrastructure. The National Water Reuse Action Plan (WRAP) promotes the sustainable use of our water resources. Ultimately, Havrelock suggests that our choices about how to treat water will impact the quality of life throughout the Great Lakes region and will determine our ability to absorb newcomers.

¹ Hauer, M. E., J. M. Evans, and D. R. Mishra. (2016). Millions projected to be at risk from sea level rise in the continental United States. *Nature Climate Change*.

Expert Panels

Great Lakes Case Studies

The goal of the Great Lakes Case Studies panel was to highlight the current state of knowledge on climate-induced mobility in the Great Lakes region. Panel participants who have already conducted region-specific research relating to the phenomenon of climate migration were asked to share some of their findings. The case studies as well as the Q&A sessions and breakout discussions that followed are summarized below.

COVID Pull Factor Analysis: The Impacts on Climate Migration

Isaac Gendler, California Public Utilities Commission and Ross Plattel, University of Calgary

Gendler and Plattel kicked off the Case Studies panel by sharing their project, which was funded in partnership with the American Society of Adaptation Professionals (ASAP) and the New York State Energy Research and Development Authority (NYSERDA) to examine migration patterns in New York State. The goal of the study was to analyze and anticipate what towns in the Great Lakes region will become receiving communities. Their approach used the COVID-19 migration as a proxy for what could happen in the future due to climate change. Cities in New York State were classified by a methodology inspired by “Vulnerable Cities, Recipient Cities, or Climate Destination? Towards a Typology of Domestic Climate Migration Impacts in US Cities”. Several municipalities across New York State were analyzed and categorized based on freshwater resources, high vacancy rates/abundance of affordable housing; infrastructure to accommodate more residents; expressed desire to grow and be welcoming; and a history of, or interest in, improving adaptive capacity through sustainability and/or resilience efforts. Their methodology also utilized zip code data, socioeconomic data, and ClimateCheck.com to assess climate risks. Cities were then classified as follows:

- ❑ Vulnerable Cities: those at risk for climate disasters
- ❑ Recipient Cities: those receiving migrants and under pressure due to migration
- ❑ Climate Destinations: those with the potential to accept more migrants and adapt to the impacts of climate change

In general, the authors found that larger cities in New York State such as New York City, Rochester, and Buffalo fell into the Vulnerable Cities category. Albany, West Seneca, and Rhinebeck were classified as Recipient Cities. Meanwhile, small to medium-sized cities with growing populations such as East Aurora, Hamburg, Saratoga Springs, and Pittsford were identified as Climate Destinations. Potential future work for the team includes conducting more in-depth analysis around demographics and racial equity; realizing opportunities for community collaboration to create migration flows between sending and receiving cities; assessing what municipalities will be able to receive migrants who are low-income, BIPOC, or at-risk; interviewing people to better understand pull factors of certain destinations; and examining zoning and development policies and their implications for climate migration.



Seiche waves strike a shoreline structure in Buffalo, New York, in April 2018.
Image credit: NYSDEC

2 Marandi, A., & Main, K. L. (2021). Vulnerable City, recipient city, or climate destination? Towards a typology of domestic climate migration impacts in US cities. *Journal of environmental studies and sciences*, 11(3), 465-480.

Home Buyouts and Climate-induced Mobility: Lessons from New York after Hurricane Sandy

Sherri Brokopp Binder, lead researcher and president of BrokoppBinder Research & Consulting

Binder presented National Science Foundation-supported work that investigated home buyouts in New York post-Hurricane Sandy. The goal of home buyout programs is, generally, to reduce risk from future hazards via permanent relocation – something that seems straightforward on paper but is often complicated in practice. Binder conducted a mixed-method longitudinal study of three comparable communities to examine how key recovery outcomes, like place attachment and social capital, were affected by buyout programs in the five years after Hurricane Sandy.

In the first phase of the study, 2012-2013, Sherri examined the question of why a community might relocate while another might choose to rebuild. Her findings demonstrate that there is heterogeneity in decision-making when it comes to relocation and that local hazard history, place-specific cultural norms, and attachment to place can all have an influence on the choice to move (or not). In the second and third phases of the study, 2013-14, Sherri compared how place identity, place dependence, and social capital changed for residents in a buyout zone and its peripheral communities. Results show that a buyout program can lead to significant losses in all three metrics. Qualitative data from interviews with residents throughout the entirety of the study (2012-2018) support these findings – study participants expressed feelings of being forced to participate in the buyout program; the inability to find a comparable home in a comparable neighborhood, even with financial incentives; and a lack of a connection to their new communities. Analysis from the second half of the study (2014-2018) showed that the state and quality of a new home can affect whether a resident regains attachment to place and social capital over time.

Binder's study illustrates some of the complications around buyout programs, which may not always be evident from an outside perspective. This has larger implications for buyout programs nationwide, which are the subject of limited research. Buyout programs have a significant and lasting impact on people's lives and not always in a positive way. One in five program participants has moved to an equally or more risky location and 99% to a place with greater social vulnerability. Therefore, home buyouts do not always correlate to risk reduction in practice.

Case Study of Post-Hurricane Maria: Migration to the Great Lakes region

Jennifer Hinojosa, Research Director at the Center for Puerto Rican Studies at Hunter College

The final panel presentation was given by Hinojosa who shared research conducted by the Center for Puerto Rican Studies at Hunter College that examined out-migration from Puerto Rico after Hurricane Maria. Even before Hurricane Maria struck the Caribbean in 2017, out-migration from Puerto Rico was already on the rise. Out-migration continued to increase following the event which had caused 3,000 deaths, a spike in suicides, disruptions to the power supply, massive crop failure, home destruction, and over \$100 billion in damages 18 months after the storm hit. It was originally hypothesized that NYC would become a major destination for evacuees; however, cities in the Great Lakes region such as Buffalo and Rochester experienced surprisingly high levels of in-migration as a result of social and economic opportunities. Ultimately, the research shows that six of the largest 20 Puerto Rican communities in New York State are located within the Great Lakes region. According to data from the Federal Emergency Management Agency, New York received 9% of evacuees (3,683) after Hurricane Maria, second to Florida, which received 45%. Additionally, the proportion of displaced students from Puerto Rico who enrolled in upstate region school districts exceeded students who enrolled in New York City school districts, post-Maria.

The Center for Puerto Rican Studies at Hunter College has many resources available for those interested in Puerto Rican migration. These resources include case study reports for Holyoke, MA, and Hartford, CT. Challenges experienced by Puerto Rican migrants generally fall under four overarching categories relating to language barriers, cost of living, housing, and transportation. Some recommendations for how to address these issues moving forward include: creating a one-stop shop location with information and resources that are well publicized; improving coordination between agency groups; and better understanding the ability and flexibility of social services agencies to respond to migrants' and communities' needs.

Q&A Summary

The issue of privileged/planned vs. crisis/forced migration was brought up in the Great Lakes Case Studies panel Q&A. The importance of understanding and addressing these two phenomena as different and separate seems important to the broader conversation around climate migration. How migration affects vulnerable populations, e.g., the elderly, was also a topic of discussion, particularly around Puerto Rican migration after Hurricane Maria. Finally, a question relating to home buyout programs shed light on the challenges homeowners face when it comes to relocation such as an unpredictable timeline for buyouts and a lack of comparable housing options to move into.

High-Level Overview of Breakout Discussions

The panel discussion was followed by breakout sessions where workshop participants were asked to discuss the following questions:

- (1) What are the important elements of social networks needed to assist communities with mobility?
- (2) What research is needed in this area?
- (3) What law and policy developments are needed to help communities plan for mobility?
- (4) What research is needed to inform these developments?
- (5) What are region-specific tools or case studies?

Prior to identifying what elements of social networks are required to assist communities with mobility, participants expressed that clear definitions are needed to effectively communicate on the topic of climate migration. According to participants, social networks tend to refer to the relationships and meaningful connections shared between people and organizations. These relationships influence the decisions people make when they are displaced by the impacts of climate change and can shed light on where they may relocate to. However, it is increasingly important to recognize that different groups have different coping capacities and resources available to them to successfully prepare for and respond to environmental hazards.

Therefore, policies will have to be developed in order to help communities prepare for climate-driven population shifts. Participants recognized the need for policies that can secure the provision of affordable housing and prevent speculative development that contributes to rising housing costs. Land speculation can lead to climate gentrification or the displacement of low-income residents by more affluent populations when left unchecked. Land use policies that support the creation of community land trusts can help to prevent inequitable development at a neighborhood level, but it is evident that larger-scale policy and planning changes need to happen in order to address the issue. Multiple comments were also made regarding the adverse impacts of single-family residential zoning and development that encourages the separation of land uses.

Planners will play a critical role in guiding desirable development and should be aware of how climate-induced migration may impact their communities. According to participants, plans that incorporate sustainability and/or resilience elements should be implemented at a variety of scales. To date, there has been a significant amount of research conducted at the international and national levels, but the role of regional governments in planning has been insufficiently explored. State governments can also encourage local governments to take action either with legislation or through the allocation of funding. In general, more resources will be needed to address the primary and secondary impacts of climate change, especially in rural communities that have the potential to accommodate growth but are constrained by a lack of planners and resources. Participants also advocated for additional investments that can encourage community participation and continued engagement in planning processes.

Even though the Great Lakes region has been forecasted as a future climate destination, participants expressed that it is important to recognize the likelihood of uneven population shifts. That being said, there is a need for continued research and longitudinal studies that can help us better understand the long-term effects of climate-induced migration. Planned migration vs. crisis migration was also brought up as an important topic for future research in the Great Lakes region. However, it is important to recognize that migration is not a new phenomenon in the region and there is an opportunity to learn from historical case studies. Another participant suggested that additional research moving forward should focus on the how? For instance:

- How prepared are the policies in place to assist with climate migration?
- How do we reduce the trauma associated with climate migration?
- How do we design more people-centric relocation processes?
- How can we translate research findings into new policy?

Addressing such research questions, creating shared research agendas, and communicating climate migration-related stories among researchers, local officials, and communities can lead to the co-production of knowledge. Specific tools, resources, and case studies were also discussed during the breakout sessions. For example, the Lincoln Institute of Land Policy has resources and courses available relating to climate-induced migration and scenario planning. Participants also expressed that an environmental and climate justice lens needs to be applied to all models and research. The Justice 40 Initiative was one example provided at the federal level, but there are also organizations working to advance environmental justice at the local level such as PUSH Buffalo. Additional resources discussed include NYS Climate Act, FEMA Resilience Index, CDC Social Vulnerability Index, Trust for Public Land Climate Smart Cities, and finally Great Lakes Integrated Sciences and Assessments.

Climate Risks and Impacts on Underserved, Under-resourced, and BIPOC Communities

Climate vulnerability and community resilience are often skewed across socio-demographic lines. Factors such as race, gender, class, age, and ability can make it more difficult for an individual to effectively prepare for, respond to, and recover from disaster. Therefore, the goal of this panel was to better understand the disproportionate risks and impacts that climate change could have on underserved, under-resourced, and BIPOC populations across the Great Lakes region.

Climate Justice Omens? Environmental Health Capital and the Flint Water Crisis

By: Jerel Ezell Ph.D., M.P.H., Assistant Professor, General Internal Medicine and Director, Center for Cultural Humility + ReLateral Lab, Weill Cornell Medicine

Jerel Ezell began the Climate Risks and Impacts on Underserved, Under-resourced, and BIPOC Communities panel with a presentation on his research on the water crisis in Flint, Michigan. Flint, Michigan was home to the Ojibwe Tribe and was incorporated in 1855. Flint was the birthplace of General Motors and the city prospered during the mid-1900s due to the auto manufacturing industry. Based on 1960 census data, Flint had a population of 196,460 residents. However, the automation of car manufacturing processes and an increasingly globalized economy eventually led to downsizing and job cuts at the General Motors plant in Flint. These job cuts resulted in the outward migration of a largely white population of auto workers (white flight) which, in turn, led to community disinvestment. In 2017 the annual household median income was \$25,342; only half of the annual household median income for the state of Michigan. Today, Flint has a population of approximately 83,000 residents (54% Black) and a high rate of poverty across all races.

Dr. Ezell then walked through the timeline of the Flint water crisis, or what he described as “Austerity in Motion”. In June of 2013, Flint’s “Emergency Manager,” Darnell Earley, approved switching Flint’s water source to the Flint River from Lake Huron (Detroit Water Department). The stated goal was to obtain annual savings of approximately \$5 million. This occurred with little public outcry, environmental assessment, or guidance from the Environmental Protection Agency (EPA). In April 2014, public officials officially switched the water supply to the Flint River. By May 2014, residents lodged complaints about the water being discolored, odorous, and “funny tasting” to officials and on social media. At this time the State of Michigan deflected and stated that the water is “okay”. In August of 2014, General Motors raised complaints with the city that the water was causing corrosion in their assembly plants, and in October of the same year, they switched to a different water source. High levels of trihalomethanes were detected in January 2015 which was in clear violation of the Safe Drinking Water Act. Additionally, Virginia Tech researchers detected high levels of lead (Pb) in the water. By October 2015, Flint’s drinking water source was switched back to Lake Huron. Almost four years later, in June of 2019, the EPA declared Flint’s water “safe” to drink.

This series of events led Jerel to introduce the concept of “Environmental Health Capital” to workshop participants. He stated that we know “why” certain communities are vulnerable to climate/environmental injustices, but we lack strong upstream/downstream approaches to addressing this vulnerability. Therefore, environmental health capital focuses on the **knowledge** (technical, scientific, climate-related, health literacy, etc.), **resources** (infrastructure upgrades, microgrants, etc.), and **political visibility** (democratic, inclusive policy-making, oversight ability, etc.) communities need to prevent or mitigate environmental hazards. Jerel and colleagues conducted a mixed methods project (331 surveys + 75 interviews) to assess health outcomes and beliefs, attitudes, and experiences of those living in Flint during the water crisis and those involved in response efforts (i.e., “professionals”). When Flint residents were asked, “Was it even an environmental crisis?” Most people said that it was. Many people thought it was a very big issue and should be getting more attention than it was. However, there were differences in beliefs among white and black communities; white communities tended to downplay the situation more, whereas the black community thought it was a big deal and needed to be addressed. He ended his presentation by describing some of the climate intersections that this event has had, such as a growing distrust in science and institutions. For example, distrust in science and our ability to have clean drinking water has led to increases in bottled water usage in single-use plastic bottles. Ultimately, this can lead to increases in health morbidities associated with water contamination (cancer, CVD, neurological and behavioral issues, etc.)

Inequities of Climate Change Impacts: Examples from my Research

Susan Spierre Clark, PhD Assistant Professor, Department of Environment & Sustainability Director, Master’s in Sustainability Leadership, University at Buffalo

Susan Clark discussed her research on two events where climate risks exacerbated the impacts on underserved and marginalized communities. The two examples discussed were 1) Climate Vulnerability due to extreme heat in Erie County, New York and 2) Impacts of Infrastructure Disruptions in Puerto Rico as a result of natural disasters.

The number of days over 90°F in the northeastern portion of the United States has increased over the last century and is predicted to continue to increase into the next century. In order to map where the communities most sensitive to changes in climate are located in Western New York, the research team compiled data about these areas that would make a community more or less sensitive to extreme heat. They looked at various socio-economic factors that contribute to vulnerability (e.g., low-income households, lack of access to a vehicle), environmental/urban vulnerability (e.g., pavement, vegetation), elderly isolation, and language barriers. In general, the research found that populations in WNY that are more likely to be impacted by extreme heat are largely concentrated in the City of Buffalo. The urban heat island effect and a higher concentration of low-income households without vehicle access contribute to such disproportionate impacts.

Susan Clark also discussed a case study assessing the health and well-being impacts of infrastructure disruptions (i.e., power outages) for communities in Puerto Rico. What the researchers found was that households reporting a disability reported more household disruption types and experienced more severe mental health impacts. Households with young children were more likely to report the physical and mental health impacts of outages. Additionally, households living below the poverty line spent more money and time coping with household disruptions, and households experiencing longer-duration outages experienced more health and well-being challenges. Lastly, rural households reported more severe health and well-being impacts than urban households.

Migration at the Margins: Compounding Vulnerabilities for Climate Migrants and how Cities Might Respond

Kelly Leilani Main, Executive Director, Buy-In Community Planning PhD Student at UC Berkeley Department of Landscape Architecture & Environmental Planning

The final speaker for this panel was Kelly Main, who gave an overview of how compounding vulnerabilities affect climate migrants. Climate change impacts are already happening, we can see them, and it is affecting everyone. Every area in the country will be affected in one way or another and people are already being displaced, but not all migration is the same. Two types of migration were discussed; the sudden onset of events (shocks) vs. the slow onset of events (stressors). Shocks are events such as wildfires, hurricanes, or extreme precipitation events with flooding that can result in immediate displacement which may be temporary (migrants are evacuees, seeking to return home as soon as possible), or permanent (especially if no resources for return are made available). Slow onset events (stressors) include droughts, extreme heat (particularly in regions that already experience high temperatures), and sea level rise that typically do not incite sudden relocation but will likely lead to long-term shifts in economic and real estate trends by changing employment opportunities, investments, and home prices.

Main then discussed how climate change does not exist in a vacuum and will likely exacerbate existing trends of inequality unless large-scale system adjustments occur. Push vs pull factors were also a topic of conversation. Push factors are factors that drive people away from a place, such as lack of employment or decline of industries, unfavorable weather conditions, high taxes, insurance costs, lack of place attachment, and annual exposure to wildfire smoke or pollution. Pull factors are those that drive people and businesses towards new places, such as job opportunities, affordable housing, families and social ties, weather, strong anchor institutions such as universities and hospitals, walkability, and parks.

Some factors limit an individual's ability to make these choices. For example, formerly redlined areas have \$107 billion worth of homes facing high flood risk, which is about 25% more than in non-redlined areas but with 52% less wealth. In addition, renters located in areas increasingly vulnerable to extreme weather events are more likely to be non-white, live in homes that may be less resilient to climate events, have less access to post-disaster support, and have less access to pre- or post-disaster resources to enable a permanent move away from an at-risk area. Overall, low-income residents, people with disabilities, and the elderly have lower mobility when considering relocation and place attachment makes many communities reluctant to leave, especially indigenous communities and those with intergenerational ties to the land.

Vulnerable cities, recipient cities, and climate destinations were also discussed based on Kelly's research. All types of cities will experience both challenges and opportunities when it comes to climate-induced mobility. For example, proactive planning in vulnerable cities is possible, but a declining population and tax base may have disproportionate effects on underserved communities. Recipient cities may also be constrained by a lack of resources, which in-migration could exacerbate, in the absence of planning to ensure community resilience. Finally, legacy cities such as Duluth, MN, Buffalo, NY, and Cincinnati, OH have the foundation to accommodate growth and can leverage existing sustainability and resilience programs, but will need to protect and increase the provision of afford-

³ Dundon, L. A., & Camp, J. S. (2021). Climate justice and home-buyout programs: renters as a forgotten population in managed retreat actions. *Journal of Environmental Studies and Sciences*, 11(3), 420-433

able housing and encourage the creation of resilience strategies that are community driven. Therefore, housing injustice and access must be addressed in order to ensure equitable growth and redevelopment.

Finally, Main discussed the limitations of home buyout programs and offered suggestions for “designing a better buyout.” A holistic home buyout process should ask the following questions:

- Who wants to move and under what conditions?
- Where will they go and is there safe, secure, and affordable housing available?
- What happens to the land that gets left behind and who will care for it?

Community surveys can help identify the conditions, limitations, and priorities of program participants. Additional research questions as well as case studies relating to climate gentrification, affordable housing in receiving communities, and the disproportionate impacts of climate risks were also discussed with more details provided in the appendix.

High-Level Overview of Breakout Discussions

The Underserved Communities panel was followed by breakout sessions where workshop participants were asked to discuss the following questions:

What additional social-cultural-economic factors are impacting relocation decisions by marginalized communities in the face of climate change?

What are some strategies to reduce the impacts of climate change on BIPOC communities?

What role does education and awareness specifically play in mitigating impacts?

Groups discussed factors such as where friends and family currently live, the cost of living in the receiving area, and access to jobs when it came to the social, cultural, and economic factors that impact decisions made by marginalized communities in the face of climate change. Access to money was discussed as the most likely obstacle to relocation. Many marginalized communities simply cannot afford to relocate or may have difficulties finding employment in a new area. When and if marginalized communities do move, it is important to have support systems in place upon arrival for them to succeed in that area. It was noted that there is a need to distinguish between low-income renters and homeowners. As an example, for the Puerto Rican population, renters were more likely to move vs. homeowners because they were not tied down to the house (area for future work).

Strategies discussed to reduce impacts generally involved engaging with BIPOC communities. Outreach and education were key discussion points, especially in frontline communities. Outreach needs to include listening to communities, should include community input, and humility is important. This should also include building awareness of the impact of terminology because some have negative connotations or are not well received. It was noted that these discussions can be difficult and there can be tension in targeted communities. Therefore, organizations that are trusted and are already conducting outreach should be leveraged to get support and buy-in from the larger community. Additionally, participants expressed that increasing jobs in green infrastructure within BIPOC communities has worked in Duluth, MN to reduce the disproportionate impacts of climate change.

In general, the groups felt as though education and awareness plays a large role and that it increases buy-in when it comes to mitigating impacts. It can encourage the creation of more sustainable solutions that work for specific communities instead of imposing something on them and can lead to the development of plans that have long-lasting positive impacts. Participants also expressed that there should be a reciprocal relationship between education and awareness and that the academic approach has been ineffective and sometimes even harmful. Additionally, keeping in mind intersectionality is important because people self-identify in many different ways and one organization may not be representative of the whole community. Bottomline is that each community and situation is different and that different approaches are more or less effective for different populations.

Needs of Receiving Communities

The purpose of this panel was to help get an understanding of what receiving communities might need to do in order to prepare for climate-induced human migration. Obviously, the details will vary from location to location, but by getting a variety of perspectives, we hoped to be able to help spur thoughts on the parts of our participants.

City of Duluth, Minnesota

Mindy Granley, Sustainability Officer at the City of Duluth

Mindy Granley began the panel session by discussing her experience in the City of Duluth, MN, where she is the Sustainability Officer. Recently, there has been significant media attention regarding what the city would need to do to become a receiving community. Preparing for the social, environmental, and economic impacts of population growth will require the city to become more resilient. Duluth needs to take steps to mitigate its climate impact, repair and improve its infrastructure, and adapt to the expected effects of climate change according to Granley.

To work toward this, the city has recently developed a Climate Action Work Plan, which is a five-year plan covering four major areas. These major areas focus on driving down emissions, strengthening the resilience of different systems, eliminating barriers and enabling action through policy, and addressing financing and workforce barriers that may hinder progress. By developing and enacting this plan, the City of Duluth has reaped several benefits, including (1) having a list of several shovel-ready projects for when funding opportunities became available, (2) helping city officials work across silos through the city Sustainability Advisory Team, (3) identifying gaps and inequities in different communities, and (4) developing several key collaborations, including with the Department of Energy.

Duluth is on the coast of Lake Superior and managing the waterfront is a key component for increasing resilience and preparing for potential climate migration. The city is actively working towards acquiring coastal properties in order to restore and protect the waterfront while increasing public access to it. Mindy additionally identified several research needs that would help her community, including case studies, cost/benefit analyses of different actions, storytelling to show how increasing resilience works and that it is wanted by the public, and specific research to help address the technical challenges of building resilience in a changing climate.

City of Ann Arbor, Michigan

Missy Stults, Sustainability and Innovations Director at the City of Ann Arbor

Missy Stults is the Sustainability and Innovations Director at the City of Ann Arbor and she discussed what Ann Arbor has done, and still needs to do, to prepare for climate migration. Ann Arbor is a progressive city that has a goal of being carbon neutral by 2030 in a just and equitable way. The existence of climate change is not particularly controversial in Ann Arbor as the community is already experiencing climate impacts, including a 37% increase in heavy rain in the area. Ann Arbor's political climate might give the city a head start in preparing for climate resilience, but the city needs to take additional steps to prepare for climate-induced in-migration. Missy identified several actions the city can take which can be broadly organized into the following categories: research, staff development, policy, capacity building, and communication.

Research needs include better estimates of how many people to expect and when to expect them, even if the data is imperfect. Scientists are often hesitant to share incomplete or provisional data, but the city needs something to work with, even if it's messy data. In addition, the city needs to find and measure metrics that matter. Staff development needs include training to ensure that all city staff are climate literate as part of a general shift in staff culture toward climate literacy. Policy needs include relevant, appropriate, and applicable policies that support smart and sustainable growth. It can be hard to take a code from one state and import it to another because the legal approaches to relevant issues often vary by state. Tools need to be contextualized, and this takes time. In addition, general policy ideas need to be made into specific policies. For example, take the case of land protection: who does the land need to be protected for? From what? What are the intentional and unintentional impacts of protecting land? Some policies, in particular those related to zoning, can be controversial or impossible to enact, as well. Capacity needs include people and money to work on this critical issue and finally, communication needs include the tools and time to have difficult conversations about these challenging issues. These conversations need to happen across political boundaries and need to acknowledge that there are parts of the climate story that are messy. But, by having these conversations, the community can continue working toward finding feasible ways to address climate-related challenges, ways that are legitimately useful, avoid greenwashing, and help put Ann Arbor on a path that will lead them through the climate challenges into an area of sustainable and resilient growth.

Northwestern Indiana Regional Planning Commission (NIRPC)

Ty Warner, Executive Director at NIRPC

As executive director of the Northwest Indiana Regional Planning Commission (NIRPC), Warner brought an important regional perspective to the panel. He spoke of the need to balance industry and community growth with land protection in NW Indiana, which can be a challenging balance to strike.

Warner shared his experience as executive director of the Flint Hills regional planning body in Kansas, which is relevant to climate migration because it received a large influx of military staff and their families: about 9,000 soldiers and their families lived on the base and approximately another 9,000 settled there as the soldiers returned from deployment in Iraq. Accommodating that many people required regional collaboration. Regional organizations such as NIRPC are an ally that can assist with that.

Without regional coordination and communication, there is a possibility of repeating the mistakes that were made after World War II: namely, suburbanization and urban sprawl. Regional coordination can help to prevent or minimize this. Good planning on the local and regional levels can take advantage of existing infrastructure without turning to suburbanization. Warner gave a series of positive examples of regional and local efforts which include:

- The Niagara Square Apartments in Buffalo, which are a good example of infill that people could observe while in the city.
- The Marquette Plan (<https://nirpc.org/2040-plan/economy-and-place/marquette-plan/>) in Northwest Indiana, an example of developing a compelling long-term vision for planning across the Indiana Lake Michigan shoreline. Finally,
- Union Lake near Seattle is a good example of parks developed in former industrial spaces.

Ty also discussed the importance of leveraging Metropolitan Planning Organizations (MPOs), which cities with populations of over 50,000 must have as a conduit for federal transportation funds. MPOs and regional planning bodies can build long-range goals into regional plans, which can set a framework for partners and allies going forward.

Q&A Summary

The receiving communities panel was followed by a Q&A session which started with one participant asking the panel how many people their cities can realistically accommodate moving forward. During the early 1980's Duluth had a population of approximately 100,000 people. Today the City of Duluth has a population of approximately 80,000 people and Mindy believes the community could easily accommodate 20,000-30,000 more people. Missy's response suggested that the number of people Ann Arbor can accommodate is highly dependent on a variety of factors. From a social perspective, some would say "zero" and others would say "as many as we can." From a logistical perspective, Ann Arbor could handle 40,000-60,000 more residents if additional housing is built. At a much larger regional scale, Northwest Indiana could accommodate as many as one million additional residents and is already planning for densely populated communities to be developed around rail stations as highlighted in the Northwest Indiana (NWI) 2050 plan.

Another participant posed the question: how long will climate migration planning be necessary based on climate change projections? Ultimately, the panel suggested that planning is an iterative process and that this work will never truly stop. The social, environmental, and economic impacts of climate change and climate-induced migration will not abide by municipal or regional boundaries. Therefore, some of the opportunities and challenges of planning beyond a community's jurisdiction were also discussed. Warner stated that NW Indiana meets 3-4 times a year with other regional organizations outside of their area to discuss how different issues might affect the area at large. At the municipal level, Mindy stated that regional relationships can be difficult but there remains an opportunity to learn from regional case studies and that the City of Duluth continues to work with regional planning groups to address regional issues such as stormwater management. Meanwhile, Ann Arbor coordinates with a group of over 100 organizations and embraces scenario planning that allows the city to prepare for and adapt to a variety of different situations.

The last question asked during the Q&A session prompted panel participants to explore the most effective examples of storytelling and how we can better tailor climate change stories to reach those who resist the subject. When it comes to scenario planning, federal transportation law requires planning bodies to identify a preferred scenario. Instead of identifying a preferred scenario, Northwest Indiana identified three different "future states" and shared stories and visualizations about what those future states might look like. Ann Arbor's approach to storytelling has prioritized daylighting sustainable business practices and normalizing such stories through plaques, for example. However, Missy suggested that stories that are told by the individuals who lived them may resonate better. Using the data to tell emotionally appealing stories was finally suggested by Mindy from Duluth.

High-Level Overview of Breakout Discussions

The breakout rooms addressed the question of information needs in communities: what information and resources do communities need to assess their risk to climate change impacts?

A common theme in the breakout rooms was that some communities have a lot of information, others have less, but they all have a need for support and authority to make decisions at the local level. Communities need data, especially related to the timing of when potential climate effects and potential migration might occur. This information would be especially useful if delivered in a way that is actionable and meaningful to the communities; often there is a disconnect between communities' needs and researchers' outputs. Other disconnects between researchers and communities include the scope of problems that researchers address (see the research breakout for more information), the fact that research and modeling often reveal uncertainties that make it hard for planners to plan, and the often-slow pace of research progress.

In addition, people expressed concern for the different effects of in-migration on different types of cities: large cities can absorb more people more easily than smaller cities can; if smaller cities are the target of more in-migration they will need increased resources to handle the change. Communities may not have a good handle on what their capacity really is, or how their capacity compares to the number of potential migrants. In addition, different cities have different existing problems (e.g., infrastructure challenges, dilapidated housing stock, brownfields and other polluted areas, access to natural resources such as water, etc.) which could be exacerbated as the population increases.

Another common concern was staffing and capacity: many communities simply don't have the personnel or resources to help adequately prepare. There is rarely enough staff to work on these issues and, when there is, it is often a small part of someone's job. There are often gaps in the local and regional planning infrastructures, too: cities may or may not have a climate plan, they may or may not have policy mechanisms in place to help policymakers, they may or may not have access to good model ordinances to develop their own policies where necessary, and they may or may not have the political ability to act on any of these things. To alleviate these challenges, the conversation about climate migration needs to continue and communities need access to positive exemplars, best practices, and practical, useful information about how to prepare.

Notes from the Field: Experiences of Planners, Policy Makers, Teachers, Social Workers, and Others Engaged in Assisting Migrants

The goal of this panel was to highlight the experiences of individuals who already find themselves working in the field either directly or indirectly. Planners, policymakers, teachers, social workers, and practitioners from a variety of backgrounds each brought a unique perspective of the opportunities and challenges of climate-induced population shifts in the Great Lakes region.

Challenges and Opportunities related to Climate-induced Human Migration from the Perspective of Practitioners and Researchers

Beth Gibbons, Executive Director, American Society of Adaptation Professionals

Beth Gibbons discussed some of the challenges and opportunities related to climate-induced human migration based on her experience at the American Society of Adaptation Professionals (ASAP). ASAP's mission is to connect and support professionals working in the field of climate adaptation. The non-profit organization advocates for collaborative, inclusive, and open conversations that can help us better understand the potential impacts of climate migration in the United States. Beth expressed that climate migration is a relatively new topic for ASAP and that it is also a sensitive one. Therefore, climate justice must be at the forefront of conversations relating to climate-induced human migration and expertise should reside with those who are living this story.

Applied research related to receiving communities has been underdeveloped, but over the years ASAP has engaged tribal and rural communities in conversations to better understand the climate migration-related challenges they face. These conversations have aided in the co-production of knowledge and have shed light on the growing pressures of development on tribal lands and how the concerns of rural communities are similar to those in urban settings when it comes to changes in land use patterns, preservation of community character, conflicts in culture, and land fragmentation. Beth concluded her presentation by discussing some key points regarding climate-induced migration. In general, there is a need to center human rights agency and ownership across everything we do. Additionally, there is a need to look at sending and receiving communities together rather than separately. Professionals will require additional training in order to facilitate cross-sector and cross-scalar conversations that can encourage policy intervention and change. Finally, it will be important to assess what industry changes can be expected and what has already changed.

Experiences, Challenges, and Opportunities Related to Climate-induced Human Migration from the Perspective of Educators

Dan Walsh, English Language Support Teacher, East Middle School (Erie, Pennsylvania)

Dan Walsh shared the challenges and opportunities related to human migration from the perspective of an educator working with students who are refugees in a receiving community. Dan began his presentation by identifying relevant terms and the differences between refugees, immigrants, and migrants. Refugee refers to a person forced to leave their community, due to war, persecution, or natural disaster. Meanwhile, a person who is living permanently in another country would be considered as an immigrant and a person that moves from one place to another for work or better living opportunities would be considered as a migrant.

Dan then proceeded to share his experience working at East Middle School which is located in the Erie School District in Erie, Pennsylvania. East Middle School serves 583 students, 95% of whom live below the poverty level. This includes 183 English Learners (ELs) from 16 countries. ELs are students who have been identified as not having enough English language ability to reach their full academic potential. Dan provides four levels of EL service at East Middle School which starts with a newcomer academy and is followed by push-in support, observe and support, and exit and monitoring. Students maintaining at least a C grade on their own are integrated into mainstream courses. Support systems and partnerships such as the Community Schools Model (United Way), U.S. Committee for Refugees and Immigrants (USCRI), and the Multicultural Resources Center (MCRC) make this work possible.

Dan concluded his presentation by discussing the specific challenges and opportunities of working with ELs. Challenges discussed include trauma, language and cultural barriers, socioeconomic status of schools receiving refugees, a lack of cultural awareness, bullying, and the limited nature of resources (e.g. transportation and food) in already under-resourced systems. Opportunities discussed include inner city reclamation (refugees, immigrants, and migrants buy homes, start businesses, pay taxes, and can help advance revitalization efforts), diversification, blossoming culture in schools, and wonderful parent-teacher interactions.

The Road to Resettlement: An Overview of Wisconsin's Resettlement Program to better Understand Refugee Resettlement and Migration

Kristen Olsen, Refugee Programs Coordinator, Wisconsin Department of Children and Families

Kristen Olsen provided an overview of the refugee resettlement process in Wisconsin based on her experience as Refugee Programs Coordinator for the Wisconsin Department of Children and Families. Refugees may leave their home country for a variety of reasons and even though there is no United Nations designation to grant refugee status based on environmental conditions; Kristen expressed that Wisconsin has been seeing more migration due to climate. Refugees gain entry into the United States by applying for resettlement, which must be approved by the Department of Homeland Security. There is, however, an annual ceiling placed on the number of refugees who can enter the country. The ceiling was set at 70,000 refugees in 2014 but declined to 25,000 in 2022 as a result of U.S. politics.

Following approval for resettlement, refugees tend to be placed in cities and large towns where resources, jobs, and cultural services are more readily available. However, receiving communities and refugees may still find themselves challenged on multiple fronts. For example, communities often receive short notice of arrival, leaving little time to arrange resources. Refugees may also struggle with inflation, a high cost of living, social isolation in the absence of cultural resources, and a lack of accessible goods and services in rural areas. Secondary migrants, who leave their original resettlement community for an area with more opportunities for social and economic advancement, face additional challenges, such as a loss of initial resettlement services. Uprooting can ultimately limit the success of refugees in a new location when new communities have no knowledge of their upcoming arrival which makes it difficult to prepare. Kristen concluded her presentation by posing the following question: "how do community leaders, climate scientists, and others factor in the refugee experience?"

Climate Migration Considerations for Grand Rapids, Michigan

Annabelle Wilkinson, Environmental and Climate Justice Specialist, City of Grand Rapids

Annabelle Wilkinson discussed climate migration considerations for Grand Rapids, Michigan. Grand Rapids is the second largest city in Michigan with a population of approximately 200,000 people. Annabelle began her presentation by discussing an article titled "Will Climate Change turn Michigan into a climate haven?" that appeared on WOOD-TV 8 website. Grand Rapids' diverse job market, education and healthcare systems, manufacturing industry, cultural offerings, access to freshwater resources, and mild impacts from climate change may make it an ideal community for migration according to the article. Annabelle subsequently highlighted the

challenges and opportunities associated with in-migration in Grand Rapids. Five overarching challenges were discussed in categories relating to affordable housing, substandard housing, transportation, utility infrastructure, and community safety. To start, more than half of all renters and 27% of homeowners in Grand Rapids pay more than 30% of their income on housing. Annabelle expressed that the community's Black population is disproportionately impacted by cost burden, substandard housing, and homelessness despite only representing 12% of the County's total population. The high cost of living and an insufficient supply of affordable housing also contributes to climate gentrification or the displacement of low-income populations by more affluent ones. Low-income populations displaced by rising housing costs in the city often have no choice but to relocate to suburban areas with low walk scores and poor public transportation options which creates inequities in access and mobility. Unreliable utility infrastructure in Kent County and energy burden also create additional inequities for low-income households. Finally, ensuring the safety of refugee and immigrant populations has also been a challenge in Grand Rapids according to Annabelle.

The City of Grand Rapids was one of 13 communities across America that received a Gateways for Growth (G4G) award to be more welcoming. The Kent County Welcome Plan provides a foundation to create a more inclusive and equitable environment for both immigrants and refugees. Immigrants representing countries such as Mexico, Guatemala, Vietnam, Bosnia, and Canada are vital to boosting the County's economy and in 2018 they paid \$376 million in taxes and had \$1.1 billion in spending power. Annabelle then introduced Community Collaboration on Climate Change (C4) which is an organization with a vision of dismantling extractive systems in favor of more equitable ones. Moving forward, climate migration will only exacerbate existing inequities within the Grand Rapids community, and emphasis was placed on the need for equitable planning at the city level that can increase the quality of life and enhance community resilience.

How Potential Population Migration due to Climate and Economic Forces was Addressed in Developing the Great Lakes-St. Lawrence River Basin Water Resources Agreements

Don Zelazny, Great Lakes Program Coordinator, New York Department of Environmental Conservation

Don Zelazny discussed his experience representing NYS in the Great Lakes-St. Lawrence River Basin Water Resources Agreements. The Great Lakes-St. Lawrence River Basin Sustainable Resource Agreement (2005) and Great Lakes-St. Lawrence River Basin Water Resources Compact (2008), developed by the Council of Great Lakes Governors, detail how States and Provinces will manage and protect the basin. Don detailed the genesis of the agreements and the processes and negotiations that took place to move the agreements forward. During the development of the agreements, it was decided that decisions had to be made based on natural resources and not economics, and that control of the water should be made by Great Lakes communities. Don also discussed how preparing for an influx of people into Great Lakes "climate havens" was factored into the agreements.

Q&A Summary

The Q&A session that followed the Notes from the Field panel began with a question regarding the Great Lakes compact, its major shortcomings, and the work that still needs to be done. The response detailed some of the challenges of managing a major diversion of water out of the basin in Wisconsin that occurred approximately four-five years ago. At the time, there were no procedures for implementing such a diversion. Procedures were eventually developed to establish a volume of regulations/guidance for the ten jurisdictions involved. Such regulations made it possible to ensure accountability, but different populations hold different perspectives when it comes to water conservation and these laws are only as strong as public support for them.

Another participant had a question about the Kent County Plan and whether it targets specific populations/communities to which Annabelle expressed that the plan applies to both refugees and immigrants but could apply to other groups as well. Refugee resettlement was the topic of the following question and, more specifically, what graduate programs would be useful to enter the field? The panel suggested that the field can be approached from many different disciplines and that some specialists are educated in public policy, administration, or social work. It was then recommended to find a local organization and see if there are opportunities to volunteer to get more involved. How communities determine the annual ceilings for refugees was also discussed in more detail. Local resettlement agencies essentially partner with the national resettlement agency to provide the number, which is based on the availability of funding, community resources, and staffing.

The last question was directed toward Dan Walsh regarding under-resourced public schools and whether technology has been utilized for translation services. Dan expressed that during the pandemic, a lot of technology funding was provided for students to receive Chromebooks which leveled the playing field but as an educator, he finds it easiest to communicate directly with the students rather than using apps as many of the apps do not translate very well.

Current State and Future Needs for Research, Policy and Outreach/ Education

Process

During the second and third days of the workshop, participants engaged in discussions to identify the current state and future needs for networks in research, policy, and outreach/education related to climate-induced human migration in the Great Lakes region. In order to achieve active participation from workshop attendees, these discussions were held in three breakout rooms, each with its own focus (research, policy, and outreach/education).

Participants were able to select one of these focus areas when they registered for the workshop. This selection would be their destination for the first breakout room. Each breakout session was tasked with answering the same set of questions:

1. Where are we in this work now?
 - a. What are the policies/research/outreach (depending on the room) being done?
 - b. What are the resources?
 - c. What structures exist?
2. What parts of a network are already available?
3. Where do you want to go?
4. What do you want a network to achieve?

After the first hour, the attendees in each breakout then rotated to a different breakout room to answer the same questions but for a different focus area. For example, the workshop attendees that selected research as their first preference spent the first hour in the research breakout room, then rotated to the policy breakout room for 40 minutes, and then finally the outreach/education breakout room for 30 minutes. This rotation of breakout rooms is called a 'carousel'.

On the morning of the third day, workshop attendees reconvened in their original focus area breakout rooms to prioritize what the group wanted to achieve and then identify specific steps for getting there. Breakout room discussions were facilitated by members of the Great Lakes PEMOCC planning committee and New York Sea Grant. Additionally, each room had a notetaker.

Research Breakout Summary

This breakout group discussed key questions related to the state of the research and how it might be used to help inform climate migration policy.

Where are we in this work now?

The breakout group felt that, from a research standpoint, we are still in the very early stages of this process. Minimal research has been conducted and there are many challenges to overcome. Therefore, participants identified some of the general challenges and questions that research should address moving forward. For example, as of right now, most climate-migration-related research in the United States is theoretical and general. Participants expressed that we need a better understanding of how climate change will specifically impact municipalities at the local level for the research to become useful to community decision-makers. Decision-makers might also benefit from research that analyzes how climate change interacts with other factors that might affect human movement.

Participants also pointed out that there is a lot of data that is currently being collected by private companies such as moving companies, social media, cell phone providers, etc. This data may not be available to the public, but it could be valuable for studying migration. Migration-related theories currently anticipate how people might move rather than how they might optimally move; prompting participants to question how we can encourage "better" migration. In light of recent research that shows the adverse impacts of home buyout programs and how people typically don't want them; follow-up research should be conducted into what programs people do want and support. Additional political science research relating to climate-induced human migration may also be required, even though the questions are deeply political, as the research that has been done is often too high-level to be useful to communities and practitioners. Similarly, the level and form of knowledge vary across the disciplines that are working on these issues. Consequently, participants questioned how we can encourage interdisciplinary or transdisciplinary communication and knowledge-sharing. Integrating research into practice was identified as a challenge, as well. There is a need to think about problems holistically, but that requires two-way conversations among researchers and practitioners. There were several concerns or barriers to this that were raised as part of the breakout. Often, research that is being done is repetitive or answers questions that are adjacent to already existing research. This is part of the scientific process, but it means that progress is slow and can make it challenging to integrate research into policy decisions. As one person in the policymaking community put it, "That's great research...but what do we do?"

Additionally, there is too much turnover in the research-policy realm according to participants. Sometimes, it's researchers moving to other projects or other institutions, sometimes, it's policymakers moving to other positions, but regardless, the turnover makes it hard to develop productive relationships. It can also erode trust between researchers and members of the community. There are few incentives for academic researchers to apply their research in communities. This makes it challenging for communities to incorporate research into their policymaking process. However, the increase in the number of academic researchers looking for jobs is also an opportunity for communities to hire people with research training and skills. This might help better integrate research into practice. Communities want specific information: how many people will move, and when? This has not been addressed by research to date, potentially because the question is too challenging to answer.

While recognizing that integrating research and practice is a challenge, the group identified several factors that could help better integrate research into practice: Research needs to both be applicable to people and actually be applied in order for it to be helpful. Both researchers and communities need to realize that research is an iterative process in which researchers will return to communities throughout a project, share results, and get feedback on next steps. A true co-production model is more likely to be successful. To better connect with communities, researchers should consider more traditional environmental knowledge and place-based knowledge. There needs to be a budget for working with communities throughout the project, not just at the end.

What parts of a network are already available? What do you want a network to achieve?

Much of the discussion was around the possibility of trying to foster a network around climate migration in the Midwest or Great Lakes region. While there wasn't a precise idea of what this network would look like, the group felt that including researchers, practitioners, and policymakers could help translate data into action and help researchers to develop close relationships with practitioners to facilitate the two-way sharing of information. Better information sharing would help researchers develop better research questions and help policymakers better integrate research into their policymaking process. Partnerships could help spur better research and help move findings from the ivory tower into communities in a way that is useful to the communities and can lead to actions.

A network could help to ensure that efforts are not being duplicated, reducing wasted time and effort, and help to consolidate the research that is being done into something that is helpful to communities. In addition, a network might help to build trust and promote standards and norms for interacting with communities, since very often researchers enter a community, get answers to their research questions, and move on to the next project, potentially abandoning the communities and relationships that have formed. This is particularly a challenge in under-served or otherwise vulnerable communities, which often are constantly researched without anything meaningful coming out of it for the communities.

While the breakout group was not aware of a formal network working on climate migration research at this time, they identified several key organizations and groups that either might be interested in being part of such a network or might be used as models for a network. These organizations include research groups and those who might work with research groups to help research inform policy decisions. The groups mentioned include:

- ❑ [Arctic Council](#) - a sustainable development group looking at migration issues and climate impacts, which might be a good framework for other climate migration networks.
- ❑ There are lots of people working on migration, generally, who might be interested in working on climate migration, specifically.
- ❑ There are many climate-related research groups that might be interested in leveraging their work on climate into work on climate migration. Someone gave the example of the [Climate Pipeline](#), but there are many more.
- ❑ Existing insurance and business groups could be part of a network, including the [Insurance Institute Business of Home Safety \(IBHS\)](#), the [Federal Alliance for Safe Homes \(FLASH; an insurance-associated nonprofit\)](#), and more
- ❑ Several Great Lakes climate adaptation groups, including the [Great Lakes Climate Adaptation Network \(GLCAN\)](#), the [OUTSTEPS Regional Research Network](#)
- ❑ ASAP works to bring researchers and practitioners together, climate migration was an attractive topic because of how interdisciplinary it is
- ❑ At Hunter College, they worked to develop relationships with researchers studying climate in Puerto Rico, creating a large database to try to bring information together. This could be a model for other work in climate migration.

Closing Activity

We ended by asking practitioners and policymakers to complete the sentence "Climate mobility research can help outreach and education by..."

Popular answers included:

- increasing understanding of how things and people are connected
- finding the right populations for outreach messaging
- being accessible
- building questions
- increase equity

Policy Breakout Summary

In this breakout group, we discussed several key questions and then identified specific actions that a Research Coordination Network could take, prioritized them, and then identified next steps for the top three actions.

Where are we in this work now?

This breakout group identified a variety of organizations that could be engaged in a network to discuss policy needs related to climate-induced human migration. Some groups are knowledge brokers and are specifically targeting the issue such as the American Society of Adaptation Professionals (ASAP), Climigration, and the Sea Grant network. Other organizations that represent various levels of government, such as the National League of Cities, could also be potential partners in a network. Other entities include agencies, empowered by federal laws and regulations, that can assist in this topic such as:

- Army Corp of Engineers - infrastructure projects; annual project lists; planning funding
- Federal Emergency Management Agency– disaster assistance, the National Flood Insurance Program.

Federal initiatives such as the White House's Justice 40 initiative can help reduce the furtherance of inequities by highlighting the need for and providing federal resources to the most stressed communities. In addition, CDRZ: Community Disaster Resilience Zones Act of 2022 (H.R. 7242) is moving through Congress and would provide more financing for projects in resilience zones:

<https://www.congress.gov/bill/117th-congress/house-bill/7242/text>

States and cities are also passing laws, programs, and policies which could be used to address issues related to climate migration. These state efforts address climate change gas reduction, environmental justice, environmental taxes and required local planning. Cities have required a percentage of disadvantaged workers on each new project, community involvement in determining community benefits of projects and requiring affordable housing in new development. There have also been cities that have successfully moved areas out of the flood zones.

The group also recognized that we can learn from past events which have either driven migrations (such as natural disasters) or encouraged migration (such as economic development campaigns). Storm-driven long- and short-term migrations like those which occurred post Hurricanes Harvey, Maria, Katrina, and Sandy could be studied as well as possibly tourism campaigns (such as MI) and economic development campaigns (such as with Ohio). Devastating contamination events such as that at Love Canal which forced relocation can also be an area for understanding managed retreat when groundwater is contaminated. Other ideas for tracking where people have moved from and may ultimately return to could be gleaned from an analysis of casket movement.

Where do we want to go? What do we want to achieve?

The network should support communities in achieving their goals. In many cases, these goals are related to resilience and equity.

Communities want to be involved in research and the co-production of knowledge. Generally, researchers are publishing papers and identifying cities where climate in-migration is likely to occur. A key question that communities and others are not being asked is whether they want to be a destination for climate migrants.

As communities prepare to potentially receive climate migrants, they are keen to do so in a way that provides for climate adaptation, resilience, and community equity. Given that there is fast and slow migration, how do communities prepare in both instances in a way to decrease existing inequities in these neighborhoods? If migrants with resources move into an area, how does the community harness associated revenue to decrease or diminish existing inequities and prevent gentrification? Policy research in these areas would be appreciated.

There is a desire to discourage people from reinhabiting the same locations or types of living structures after they have been displaced due to climate-related extreme weather events. Examples given included when mobile home parks are destroyed during events but are then repopulated and coastal areas that suffer from repetitive losses from hurricanes and storm surges.

Other preferred future states were to use the opportunity for growth to rehabilitate older homes and buildings (as well as infrastructure) instead of building or buying new homes and buildings. Participants asked how to incentivize this practice. There were concerns about examples of funds being used to renovate homes but then they were sold as second homes instead of primary residences.

The group also supported equitable growth and discussed policies that could assist in increasing resources to underserved and under-resourced communities and neighborhoods. An example is increasing (diversifying) land ownership in lower-income communities. For example, in Buffalo, a community land trust purchased and gifted property to Habitat for Humanity for their program to build and sell homes to low-income families.

Other communities, such as Ann Arbor and Evanston, are discussing reparations approaches to lower the wealth gap and empower black and brown communities. Land trusts, although they may be part of the solution, there was a cautionary note that land is not transferred and flipped for more expensive housing. Land trusts should be used to keep resources within the existing community.

Master planning was also mentioned as a tool to help prepare for increases in population. However, there were concerns about the costs. Suggestions for addressing cost concerns included grants that might be available for smaller communities and the idea of creating fellowships for new professionals to work with communities through this planning process. Fellowship models were cited.

State building codes are hindering groups from getting creative to creating affordable housing. For example, some cities require separate HVAC systems for each unit. Codes prevent the construction of Accessory Dwelling Units (ADUs) or communities from sharing utilities. Some codes and zoning prevent higher-density occupancy. In addition, newer climate laws, in an effort to prevent the emission of greenhouse gasses, are potentially requiring building changes and those costs can be burdensome.

Where do we want to go? What do we want to achieve? - PRIORITY ACTIONS

The group then reviewed the brainstorming notes and created nine potential next steps for the network. The group then used dots to prioritize the activities.

- Focus on the need for National-level Climate Policy (shared definitions) AND Include climate-induced migration in the definition of Refugee
- Center for advising communities on how to improve building codes, ordinances, and zoning related to climate migration
- Regional Policy (ex. great lakes region working together, state coordination)
- One-stop-shop for innovative climate migration policy
- Data and Modeling and scenarios for planning - tell us how many people to expect and then look at city capacities to help inform them
- Need to change Cost and Benefit calculations in BRIC
- Policy on Resilience Hubs (USDN and private support)
- Preparedness plans in communities for accepting incoming people during emergency events (ex. Puerto Ricans that came to Buffalo)
- Synthesis of all federal funding opportunities that can be accessed by communities for climate migration

The top activity was to promote a national-level climate policy and to prioritize the development of shared definitions for terms such as resilience, migration, and refugees. Specific steps and resources needed include the following:

- Contact ASAP to get your elected official to sign onto bill
- If the bill is passed, this network may want to advocate for who they would want on the Advisory committee (local and state representatives)
- Identify terms needed to be defined
- What groups would want to identify terms to be defined
- Create definitions
- Share definitions with group

The next top activity was to develop a one-stop shop or Center for Advising communities about codes, ordinances, and policies related to climate migration. Specific steps identified included the following:

- Identify existing resources and players
 - Examples: World Resources Institute, Pace Land-use center, RMI, Columbia
 - Often communities do not know what zoning ordinances allow. Visualizations can really help people (see #2).
- Data, modeling, scenarios, and case studies relevant to climate migration so that we can help identify how communities can adapt existing resources in order to implement local
 - include demographers and municipal organizations
 - Needs to stay laser-focused on climate migration
 - Communities need visualizations (i.e. maps)
- Convene existing players to tease out codes and ordinances that are useful for climate migration
- Identifying individual community needs and what resources can be adapted to help them (you have to think about scale and scope)
 - Rapid vs. Slow migrations - have resources for communities for each type of migration
 - Rural vs urban

The final top activity further discussed was the coordination of Great Lakes Regional and State Policy. Specific steps and resources needed include the following:

- Bring together State Coastal Management people, PEW Center (bipartisan think-tank), Northeast Midwest institute, to discuss current policies
 - important from a rural perspective, not just urban
 - with a focus on water and people
 - centered on equity and justice

Education/Outreach Breakout Summary

Educators and professionals from a variety of different backgrounds that interface the public gathered during this panel to discuss the role education and outreach has to play in addressing climate-induced migration in the Great Lakes region.

Where are we in this work now?

When asked where we are in this work now, participants of the outreach and education breakout room expressed that we are at the very beginning and that climate migration-related outreach and education is in its initial stages. To date, climate migration has not been formally addressed in their own outreach and education-related efforts but according to participants the framework for doing so already exists and this may be the perfect space for this work to be incorporated.

Currently, there is no network of professionals conducting outreach and education directly related to climate migration. However, organizations such as ASAP, Sea Grant, and GLISA indirectly work in this space through their efforts to advance climate adaptation and resilience. Participants in the outreach and education breakout room argued that climate migration ultimately is a last-ditch adaptation strategy. Therefore, there is an opportunity to leverage climate adaptation and resilience networks and amplify the message of climate migration through these existing structures.

Resources for conducting climate migration-related outreach and education are currently lacking and there is a growing need for guidance, regulation, and funding from the state and federal governments to support climate migration-related outreach and education efforts. Participants suggested that rural and coastal communities may have the most to benefit from governmental support given the monetary barriers to capacity building. Consulting services can also be offered to identify vulnerabilities and to increase the resilience of rural and coastal communities.

Moving forward, it will be critical to identify existing stories, resources, and data to better understand where we are now and where we want to go. For example, post-industrial cities in the upper Midwest including Duluth, MN and Ann Arbor, MI have already experienced in-migration and population growth as a result of the covid-19 pandemic, which has caused property values to rise. Their approach and strategy to dealing with the primary and secondary effects of in-migration can serve as a valuable resource to other receiving cities facing similar challenges throughout the Great Lakes region.

Historical and international case studies can serve as models for both planned and unplanned migration and can help us prepare for climate migration in the Great Lakes region. Historically, the Great Lakes region has already experienced waves of both inward and outward migration. In the Great Migration of the early-to-mid twentieth century, millions of African Americans from the south relocated to manufacturing centers across the Great Lakes region because there were opportunities for social and economic advancement. However, during the latter half of the twentieth century, the decline of industry and manufacturing resulted in a shrinking population and the disinvestment of post-industrial rust-belt cities across the Great Lakes. Today there is an opportunity to learn from the historic push and pull factors that drove population change throughout the Great Lakes region as well as how the government responded to such shifts.

There is also an opportunity to learn from international case studies. For example, one participant referenced the Republic of Maldives, an independent island country located in the north-central Indian Ocean. Sea-level rise continues to threaten life in the Maldives Islands and in an attempt to adapt to a changing climate the government has invested in the development of floating infrastructure in a new city that has been designated as the “City of Hope”. However, another participant suggested that relocation isn’t always welcomed as a viable adaptation strategy. For instance, Smith Island is located in the Chesapeake Bay and is similarly vulnerable to the effects of climate change and sea-level rise. Despite their good intentions, the government was met with backlash when it attempted to move people out of harm’s way. Ultimately, community members were aware of the risks, but their decision-making process was heavily influenced by their sense of place.

Where do you want to go?

Additional literature reviews can be conducted to analyze these case studies and a platform can be created to increase access to shared knowledge and resources. One participant suggested that a survey could also be conducted to reach a more diverse group of stakeholders given that many of the workshop’s attendees were white individuals with backgrounds in research, policy, and or outreach and education-related fields. Stakeholders missing from this conversation were identified and include but are not limited to rural communities, utility companies, and farmers. Additionally, there are individuals that are affiliated with the process of moving including social workers, resettlement agencies, realtors, and land speculators that should be involved in climate migration-related discussions and decisions. The Great Lakes are also forced into an international conversation prompting one participant to question whether or not Canadian communities are thinking about climate migration.

Someone will be needed to help coordinate this work and the workforce for conducting climate migration-related outreach and education needs to be further developed. Participants suggested that workforce development includes not only how we engage and collaborate with communities but also how we create a shared understanding within the workforce itself. In order to create a consistent message, the language and the terminology surrounding climate-induced human migration first needs to be clarified and defined. From there, outreach can and should be tailored to the sending and receiving communities that we hope to engage. However, there are many uncertainties regarding who will be displaced, when they will be displaced, where they will go, and why. Trends in migration throughout the Great Lakes will likely be uneven: as one participant pointed out, communities such as Niagara Falls are experiencing population losses despite the region being anticipated as a future climate destination where in-migration is likely to occur. Although there are many opportunities associated with climate in-migration, participants suggested that we aren’t adequately serving the population that we have now. For example, one Native American reservation in Niagara County doesn’t have access to clean water. Community engagement and collaboration can help further our understanding of existing inequities as well as the uncertainties and challenges that lie ahead. Additionally, it can help us identify communities that will be open to receiving migrants displaced by the impacts of climate change and increase awareness of how climate change will impact us at the local level. Outreach and education can also highlight the importance of environmental conservation given the potential for pinch points and the limited carrying capacity of the Great Lakes basin. Finally, ethical guidelines may need to be created and or refined for conducting climate migration-related outreach and for having these difficult conversations.

Summary

At the end of the workshop participants reconvened to discuss priorities and next steps identified during the policy, outreach and education, and research breakout sessions. Participants in the policy breakout session emphasized the importance of creating a shared understanding of the terminology related to climate migration as well as the need for regulation at the regional and state level to address the issue. Education and outreach breakout session participants expressed that it will be critical to create an ethical framework for communicating with communities impacted by the effects of climate-induced migration. Next steps include synthesizing the data and information that already exists and making a directory to share resources. Finally, participants in the research breakout session shared with the group potential questions that researchers should address moving forward. For example, how do we prepare for climate-induced population change, given the unknowns, while ensuring the habitability of the Great Lakes? Next steps include continued collaboration by sharing research agendas and results.

Participants also shared major themes and takeaways from the Great Lakes regional workshop on climate migration. Although there are many uncertainties regarding who will be displaced, when they will be displaced, where they will go, and why; it remains important to proactively plan for the unknowns in order to reduce risk and ensure community resilience. Participants suggested that improvements made to improve the condition of the region's infrastructure and to expand social services will benefit both existing and future populations. Addressing climate-induced migration will require a transdisciplinary approach and ongoing collaborations between researchers, practitioners, resource managers, and coastal stakeholders as well as partnerships at multiple levels of government. Meanwhile, continued research can help in creating a shared understanding of the potential impacts and strategies that can be used to address climate-induced migration. However, participants expressed that it is critical to ensure that the findings that come out of this workshop can be accessed by participants as well as by non-participants who will be most impacted by the effects of climate-induced migration. Equity and inclusion should be a central component of all discussion and decision-making processes. Ultimately, if we are thoughtful and proactive about implementing climate resilience, we will be more prepared for climate-induced mobility in the Great Lakes region moving forward.



Village of Sodus Point, Wayne County, NY. Image credit: Coastal Flooding Survey Project, Cornell University and New York Sea Grant