Planning for Managed Retreat:
Moving in a New Direction

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About the Virginia Coastal Policy Center

The Virginia Coastal Policy Center (VCPC) at the College of William & Mary Law School provides science-based legal and policy analysis of ecological issues affecting the state's coastal resources, by offering education and advice to a host of Virginia's decision-makers, from government officials and legal scholars to non-profit and business leaders.

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With two nationally prominent science partners – the Virginia Institute of Marine Science and Virginia Sea Grant – VCPC works with scientists, local and state political figures, community leaders, the military, and others to integrate the latest science with legal and policy analysis to solve coastal resource management issues. VCPC activities are inherently interdisciplinary, drawing on scientific, economic, public policy, sociological, and other expertise from within the University and across the country. With access to internationally recognized scientists at VIMS, to Sea Grant's national network of legal and science scholars, and to elected and appointed officials across the nation, VCPC engages in a host of information exchanges and collaborative partnerships.

VCPC grounds its pedagogical goals in the law school's philosophy of the citizen lawyer. VCPC students' highly diverse interactions beyond the borders of the legal community provide the framework for their efforts in solving the complex coastal resource management issues that currently face Virginia and the nation.

I. INTRODUCTION

Climate change is altering the United States' coastline in both subtle and extreme ways. The threat is especially pressing in the Commonwealth of Virginia, which is experiencing sea levels rising faster than the global average. As global sea level rise continues to increase, coastal communities across the country must make difficult decisions about their futures. Instead of waging an endless war with the tide, one option for them to consider is the process of managed retreat, which provides a long-term solution by relocating communities away from vulnerable areas. Low to moderate income communities face a variety of additional social and equitable concerns related to managed retreat and other efforts to adapt to climate change. This paper summarizes the Federal Emergency Management Agency National Flood Insurance Program, as well as current buyout programs at the federal and state level. Next is focuses on several managed retreat and relocation case studies with an eye toward guiding low- to moderate-income communities faced with preparing for managed retreat. After analyzing these case studies, this paper proposes how these lessons can be applied to the process of managed retreat for coastal Virginia, and particularly low and moderate income communities.

A. Relative Sea Level Rise in Virginia

The many tributaries and branches of the Chesapeake Bay stretch over 11,000 miles, with over 7,000 miles of coastline in Virginia.[1] The Commonwealth's coastal areas are incredibly important historically, economically, and socially. Many of the Commonwealth's assets, including the third largest container port on the East Coast,[2] large tourist and seafood industries, and the largest naval base in the world,[3] are in the Hampton Roads region, making them highly vulnerable to rising seas.[4]

Due to geologic and geographic variables, sea levels will change at different rates in different areas. In Virginia, the seas are rising faster than the global average due to the relatively shallow slope of the mid-Atlantic shoreline, land subsidence due to isostatic glacial rebound, sinking land due to the overtaxing of local groundwater aquifers, and rising waters from climate

[1] Marcia Berman, *How Long is Virginia's Shoreline?*, VA. INST. MARINE SCI. (April 2, 2010), https://www.vims.edu/bayinfo/faqs/shoreline_miles.php ("The shoreline of the [Virginia] tidal portions of Chesapeake Bay and its tributaries stretches 7,213 miles. Adding the Maryland portion of the Bay brings the total length of Chesapeake Bay's shoreline to 11,684 miles—more than the entire west coast of the United States.").
[2] *About*, PORT VA., http://www.portofvirginia.com/about/ (last visited June 24, 2020); Matthew Chambers, *Atlantic Coast U.S. Seaports*, BUREAU TRANSP. STAT., https://www.bts.gov/archive/publications/bts_fact_sheets/october_2010/entire (last visited June 24, 2020).
[3] *Welcome to Naval Station Norfolk*, COMMANDER, NAVY REGION MID-ATL., https://www.cnic.navy.mil/regions/cnrma/installations/ns_norfolk.html (last visited June 24, 2020).
[4] Lisa R. Kleinosky et al., *Vulnerability of Hampton Roads, Virginia to Storm-Surge Flooding and Sea-Level Rise*, 40 NAT. HAZARDS 46, 51 (2007), http://www.ccpo.odu.edu/~atkinson/ccslriDOCS/ccslri/DocFolders/ScientificPapers/Vulnerability%20of%20Hampton%20Roads,%20Virginia.pdf.

change.[5] In Norfolk, sea level rose 5.33 millimeters in 2019, and this rate is increasing.[6] Currently, sea level in Norfolk is projected to rise 0.5 meters, or roughly 1.7 feet, by 2050.[7] The Virginia Institute of Marine Science (VIMS) has confirmed that the local rates of sea level rise in Virginia are accelerating.[8] In 2013, a VIMS report on sea level rise recommended that, for planning purposes, Virginian localities should anticipate a 1.5-foot increase in sea level above 1992 levels between 2033 and 2063.[9] These projections have increased with VIMS now estimating Norfolk sea level to rise by as much as 2.2 feet by 2050.[10]

B. Managed Retreat

"Managed retreat" is the process of removing people and infrastructure from areas vulnerable to rising water and reducing the community's risk by converting these areas to green spaces or allowing the water to inundate them.[11] This outcome is often achieved through government buyouts of vulnerable properties. In the United States alone, local, state, and federal governments have spent more than $5 billion over the past three decades buying vulnerable properties across the country.[12] This paper uses the phrase "managed retreat." However, the term "retreat" can have a negative connotation and can enflame this already controversial issue.[13] While

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[5] Larry P. Atkinson et al., *Sea Level Rise and Flooding Risk in Virginia*, 5 SEA GRANT L. & POL'Y J. 3, 6 (2012-2013), https://digitalcommons.odu.edu/cgi/viewcontent.cgi?article=1116&context=ccpo_pubs; Lisa R. Kleinosky et al., *supra* note 4; *Processes Affecting Sea-Level Trends*, VA. INST. MARINE SCI., https://www.vims.edu/research/products/slrc/processes/index.php (last visited June 24, 2020); *The Potomac Aquifer: A Diminishing Resource*, HAMPTON ROADS SANITATION DISTRICT, https://www.hrsd.com/swift/potomac-aquifer-diminishing-resource (last visited June 25, 2020).

[6] *Id.*

[7] *U.S. East Coast Sea Level Annual Values & Processes: Trend Values for 2019*, VA. INST. MARINE SCI., https://www.vims.edu/research/products/slrc/compare/east_coast/index.php (last visited June 26, 2020).

[8] *Id.*

[9] *Sea Level Rise Scenarios*, VA. INST. MARINE SCI., https://www.vims.edu/newsandevents/topstories/archives/2013/slr_scenarios.php (last visited June 26, 2020).

[10] *Norfolk, Virginia Sea-Level Report Card 2050 Projection*, VA. INST. MARINE SCI., https://www.vims.edu/research/products/slrc/localities/nova/index.php (last visited June 26, 2020) [hereinafter Norfolk Projection].

[11] A.R. Siders, *Managed Retreat in the United States*, 1 ONE EARTH 216, 216 (2019), https://www.cell.com/one-earth/pdf/S2590-3322(19)30080-6.pdf (defining managed retreat as "the planned, purposeful, coordinated movement of people and assets away from risk.").

[12] David A. Lieb, *Post-Flood Home Buyouts Are Emptying Midwest Towns*, INS. J. (Nov. 26, 2019), https://www.insurancejournal.com/news/midwest/2019/11/26/549663.htm; David A. Lieb, *AP: Flood Buyout Costs Rise as Storms Intensify, Seas Surge*, ASSOCIATED PRESS (May 28, 2019), https://apnews.com/5ad750cfe8c84174934b5273c7156ff9.

[13] *See, e.g.*, Liz Koslov, *The Case for Retreat*, 28 PUB. CULTURE 359, 362-65 (2016), https://pdfs.semanticscholar.org/859f/8137e6e19d45f5f3e706f08bae4c9776a714.pdf (discussing the definition of managed retreat and resistance to the idea of managed retreat); Lexy Brodt, *Residents Voice Concern over Potential for Managed Retreat*, COAST NEWS GROUP (July 25, 2019), https://www.thecoastnews.com/residents-voice-concern-over-potential-for-managed-retreat/ ("The term has taken on deeply negative connotations in Del Mar — where managed retreat would mean relinquishing multi-million-dollar beachfront homes to the rising sea, particularly in the north beach area."); *Rethinking Managed Retreat*, SASAKI (June 25, 2014), https://www.sasaki.com/voices/rethinking-managed-retreat/ ("It's a term that gets tip toed around as it's been portrayed as admitting that the government can't protect its citizens. By its very name, 'retreat' suggests defeat—and coercion rather than choice.").

phrasing is largely superficial, the framing of an issue is still important because it sets the tone for the conversation and impacts public perception.[14] For example, the United Kingdom (UK) sometimes refers to the process of removing protective shoreline armoring as "managed realignment,"[15] a term similar to managed retreat.[16] The term "managed realignment" has been called "an attempt to disentangle negative connotations" associated with the retreat process.[17]

II. CURRENT PROGRAMS

A. The National Flood Insurance Program

Because one hurdle of managed retreat is the current insurance schemes that incentivize remaining in dangerous coastal areas, this paper first discusses these insurance programs. The National Flood Insurance Program (NFIP) was created to achieve access to affordable flood insurance and mitigation and reduction of flood impact and risk.[18] The program, which is managed by the Federal Emergency Management Agency (FEMA), includes: (1) Flood Mitigation Assistance Grants, (2) Standard Flood Insurance Policies (SFIPs), (3) Servicing of Policies and Claims Management, (4) Mandatory Mortgage Purchase Requirement, (5) Preferred Risk Policies (PRPs), and (6) Increased Cost of Compliance (ICC) Coverage.[19]

Participation in the NFIP requires a community to adopt federally set minimum floodplain management regulations and standards, which provides community members access to federal flood insurance.[20] In participating communities, "NFIP insurance is available to homeowners, renters, condo owners/renters, and commercial owners/renters."[21] Unlike disaster assistance, NFIP policies are not dependent on a federal disaster declaration;[22] properties that have a federally-backed mortgage and are in a high-risk flood area, as well as properties that have received federal

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[14] *See* LUCIANA S. ESTEVES, MANAGED REALIGNMENT: A VIABLE LONG-TERM COASTAL MANAGEMENT STRATEGY? 24 (2014), https://www.researchgate.net/publication/261508267_Managed_realignment_A_viable_long-term_coastal_management_strategy (discussing how "[i]t is much harder for people to accept change if their initial perception is associated with a negative impact or connotation").

[15] Ben McAlinden, *Managed Realignment at Medmerry, Sussex*, INST. CIVIL ENGINEERS (Sept. 28, 2015), https://www.ice.org.uk/knowledge-and-resources/case-studies/managed-realignment-at-medmerry-sussex.

[16] Luciana S. Esteves & Jon J. Williams, *Managed Realignment in Europe: A Synthesis of Methods, Achievements, and Challenges*, *in* LIVING SHORELINES: THE SCIENCE AND MANAGEMENT OF NATURE-BASED COASTAL PROTECTION 157-58 (Jason D. Toft & Megan K. La Peyre eds. 2017), http://eprints.bournemouth.ac.uk/27210/1/Chapter%209_Esteves_Williams%20author%27s%20copy.pdf ("Many terms have been used as synonyms of managed realignment, including set-back, managed retreat, de-embankment and depoldering.").

[17] ESTEVES, *supra* note 14, at 23 ("Managed retreat and set-back were commonly used in earlier documents, but have gradually fallen in disuse for being interpreted as 'giving up land to the sea.'").

[18] National Flood Insurance Act, 42 U.S.C. §§ 4001-4131 (1968); *see also* DIANE P. HORN & BAIRD WEBEL, INTRODUCTION TO THE NATIONAL FLOOD INSURANCE PROGRAM (NFIP) 2 (2019), https://fas.org/sgp/crs/homesec/R44593.pdf.

[19] *See generally* HORN & WEBEL, *supra* note 18.

[20] *Id.* at summary.

[21] *National Flood Insurance Program—Who's Eligible?*, FED. EMERGENCY MGMT. AGENCY (Jan. 30, 2016), https://www.fema.gov/news-release/2016/01/30/national-flood-insurance-program-whos-eligible.

[22] *Id.*

disaster assistance, are required to have or maintain flood insurance.[23] Lenders may also require flood insurance for properties outside of the high-risk areas.[24]

Since the NFIP's enactment, there has been a wide variety of factors that have made private insurance insufficient to meet the flood insurance needs of the country. In 2019, the primary insurance coverage side of the program held over 5 million policies,[25] representing $1.3 trillion in coverage and bringing in $4 billion in revenue.[26] FEMA calculated benefits from mitigation requirements to equal approximately $1.87 billion annually in avoided flood costs.[27] These mitigation requirements include building and floodplain management regulations.[28] Communities must meet minimum standards set by FEMA based on their location within the Floodplain Insurance Rate Maps.[29] These standards are set in federal regulations,[30] specifically in the Flood Plain Management Criteria for Flood-Prone Areas.[31] These include construction permits, development review, and many other specific technical requirements based on what the area is zoned as under its FEMA flood map.[32]

In recent history, however, the NFIP has not always had the requisite funding for compounding disasters in a single year and has had to borrow money to cover its obligations from the U.S. Treasury.[33] After Hurricane Sandy the NFIP debt limit was raised to $30.425 billion in 2012.[34] However, Congress had to cancel $16 billion of debt borrowed in 2017 so the NFIP could pay claims from Hurricanes Harvey, Irma, and Maria.[35] As of December 2019, the NFIP owed the Treasury $20.525 billion.[36]

B. Buyout Programs

While natural disasters and economic conditions have caused mass migrations worldwide for centuries, planned managed retreat by the U.S. government happened as early as 1978 when the town of Soldiers Grove, Wisconsin moved away from the Kickapoo River.[37] Managed retreat

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[23] HORN & WEBEL, *supra* note 18, at 9-10; *Who's Required to Have Flood Insurance?*, FED. EMERGENCY MGMT. AGENCY, https://www.floodsmart.gov/flood-insurance/requirements (last visited June 26, 2020).
[24] *Who's Required to Have Flood Insurance?*, *supra* note 23.
[25] HORN & WEBEL, *supra* note 18, at 1.
[26] *Id.*
[27] *Id.*
[28] *Id.*
[29] *Id.* at 6-7 (these standards have the force of law because local and state governments are required to adopt the standards in order to participate).
[30] *Id.* at 6 (particularly 44 C.F.R. § 60.3).
[31] 44 C.F.R. § 60.3 (2009).
[32] *See id.*
[33] HORN & WEBEL, *supra* note 18, at 25.
[34] *Id.*
[35] *Id.*
[36] *Id.*
[37] A.R. Siders, *Social Justice Implications of US Managed Retreat Buyout Programs*, 152 CLIMATIC CHANGE 239, 240 (2019), https://link.springer.com/epdf/10.1007/s10584-018-2272-5?author_access_token=bAr_N6AU7_14U0_5I_OrxPe4RwlQNchNByi7wbcMAY6i0pTTVhGWP4AkulV6LxNlFsRLvpYsDANA8Dx97FmnZoxIcXxln3NQ8r9bkFZGGNeqt-pFbtJ4wShJuHEqyM94XoBuXD1lTgWtyRyhVP6NIA%3D%3D; *see also* Alex Greer & Sherri Brokopp Binder, *A*

programs further increased after the Great Midwest Floods of 1993, when Congress expanded federal authority to promote managed retreat by acquiring property.[38] "Voluntary property buyouts in the United States are among the longest-running programs of managed retreat globally," and are primarily achieved using government funds.[39] Yet, despite the long history of these programs, questions remain as to whether they are capable of adapting to the increasing need for buyout programs brought on by climate change.

1. Federal Programs

Currently, most federal buyout programs are funded by FEMA's three Hazard Mitigation Assistance (HMA) grant programs: the Hazard Mitigation Grant Program (HMGP), which accounts for the vast majority of buyouts; the Flood Mitigation Assistance (FMA) Grant Program, which accounts for approximately five percent of buyouts; and the Pre-Disaster Mitigation (PDM) Program, which accounts for around four percent of buyouts.[40] These programs are all intended to reduce the long-term risk of flooding to structures, including those structures insured through the NFIP.[41]

The HMGP was founded in 1989 and expanded after the Great Midwest Flood of 1993.[42] Among other actions, it provides "grants for voluntary buyouts of flood-prone properties."[43] In fact, funding buyouts is a priority of the HMGP. Between April 2000 and January 2016, the HMGP spent over $649 million to acquire 10,248 properties in forty-two states and territories.[44]

Historical Assessment of Home Buyout Policy: Are We Learning or Just Failing?, 27 HOUSING POL'Y DEBATE, Nov. 2016, at 14 (2016), https://doi.org/10.1080/10511482.2016.1245209; Chris Hubbuch, *Soldiers Grove: Relocated Town Spared Heavy Flood Damage; Former Site Inundated*, LA CROSSE TRIB. (June 22, 2008), https://lacrossetribune.com/news/soldiers-grove-relocated-town-spared-heavy-flood-damage-former-site/article_338f2216-e998-58b9-babe-028f33b7e5ab.html. However, there are earlier, less well documented examples of managed retreat undertaken by other U.S. communities on their own. For example, the town of Broadwater on the Virginia Eastern Shore floated their houses to higher ground in the 1930s. Diane Tennant, *The Eastern Shore Island Left Behind*, VA. PILOT (Jan. 16, 2011, 12:00 AM), https://www.pilotonline.com/life/article_12b4ad24-56a8-5c60-8f4f-e98efece65b2.html.

[38] Siders, *supra* note 37, at 240.

[39] Katherine Mach et al., *Managed Retreat Through Voluntary Buyouts of Flood-Prone Properties*, 5 SCI. ADVANCES, Oct. 9, 2019, at 5, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6785245/pdf/aax8995.pdf.

[40] ANNA WEBER & ROB MOORE, NAT. RES. DEF. COUNCIL, GOING UNDER: LONG WAIT TIMES FOR POST-FLOOD BUYOUTS LEAVE HOMEOWNERS UNDERWATER, 7 (2019), https://www.nrdc.org/sites/default/files/going-under-post-flood-buyouts-report.pdf; *see also* Mach et al., *supra* note 39, at 7.

[41] ENVTL. LAW INST. & UNIV. OF N.C. INST. FOR THE ENV'T, FLOODPLAIN BUYOUTS: AN ACTION GUIDE FOR LOCAL GOVERNMENTS ON HOW TO MAXIMIZE COMMUNITY BENEFITS, HABITAT CONNECTIVITY, AND RESILIENCE 5 (Apr. 2017), https://www.eli.org/sites/default/files/eli-pubs/actionguide-web.pdf [hereinafter "FLOODPLAIN BUYOUTS"].

[42] Mach et al., *supra* note 39, at 7; *see also* Robert T. Stafford Disaster Relief and Emergency Assistance Act § 404 (codified as amended at 42 U.S.C. § 5170c (2018)); U.S. DEP'T OF HOMELAND SEC. & FED. EMERGENCY MGMT. AGENCY, THE 1993 GREAT MIDWEST FLOOD: VOICES 10 YEARS LATER xiii (2003), https://www.fema.gov/media-library-data/20130726-1515-20490-1306/voices_anthology.pdf (explaining that "[t]he National Weather Service ranks [The Great Midwest Flood] as one of the greatest ever to have hit the United States," as the flooding lasted from May through September 1993 with more than a thousand levees in the Midwest failing or overtopping) [hereinafter "THE 1993 GREAT MIDWEST FLOOD"].

[43] Mach et al., *supra* note 39, at 2; *see also* 42 U.S.C. § 5170c(b).

[44] The median payout was $50,293. *See* FLOODPLAIN BUYOUTS, *supra* note 41, at 7.

HMGP funding is only available following a federal disaster declaration by the President,[45] which activates federal funds held in reserve for disaster assistance.[46] Following the declaration of a federal disaster, states, territories, or federally recognized tribes are invited to apply for HMGP funding.[47] Because only these entities can apply for HMGP funding, local governments must submit "sub-applications" in a state or territory's funding application to HMGP. This process is contingent on FEMA making funding available to the states or territories,[48] who in turn inform localities of funding availability.[49] FEMA accepts HMGP applications for up to one year after the declaration of a disaster, and can extend this deadline by 180 days at an applicant's request.[50] Securing HMGP funding can be challenging, as it requires a cost share of twenty-five percent from applicants or sub-applicants.[51] An Advance Assistance program allows applicants to request up to twenty-five percent of their HMGP funding or $10 million, whichever is less, in advance, to complete their HMGP applications.[52] However, this program may be underutilized, because of the application process to participate in the Advance Assistance program.[53] This process requires that "[t]he application must identify the proposed use of the funds, including costs in sufficient detail for each proposed activity and milestones for submitting completed HMGP applications to FEMA."[54] This complicated application process may deter LMI communities who may not have ready access to required data or who cannot afford consultants to assist them.

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[45] *See* 42 U.S.C. § 5170; 44 C.F.R. § 206.36; *see also* FED. EMERGENCY MGMT. AGENCY, THE UNIFIED HAZARD MITIGATION GRANT ASSISTANCE PROGRAMS, http://www.ocpcrpa.org/docs/projects/hmp/The_Unified_Hazard_Mitigation_Assistance_Grants_Factsheet.pdf (last visited June 28, 2020).

[46] FLOODPLAIN BUYOUTS, *supra* note 41, at 7 (citing 44 C.F.R. §§ 206.200-206.228). Disasters that have historically triggered funding include severe storms, floods, hurricanes, and other flood-related disasters. Mach et al., *supra* note 39, at 2.

[47] FED. EMERGENCY MGMT. AGENCY, HOMEOWNER'S GUIDE TO THE HAZARD MITIGATION GRANT PROGRAM, https://www.fema.gov/media-library-data/1478272128411-2eca27a89d418bb73e817edfb702cc15/HMA_HO_Brochure_508.pdf (last visited June 28, 2020) [hereinafter "HOMEOWNER'S GUIDE TO THE HAZARD MITIGATION GRANT PROGRAM"]. However, state agencies and certain non-profit organizations can also serve as sub-applicants in some cases. FLOODPLAIN BUYOUTS, *supra* note 41, at 7 (citing FED. EMERGENCY MGMT. AGENCY, HAZARD MITIGATION ASSISTANCE GUIDANCE: HAZARD MITIGATION GRANT PROGRAM, PRE-DISASTER MITIGATION PROGRAM, AND FLOOD MITIGATION ASSISTANCE PROGRAM 26 (Feb. 2015), https://www.fema.gov/media-library-data/1424983165449-38f5dfc69c0bd4ea8a161e8bb7b79553/HMA_Guidance_022715_508.pdf [hereinafter "HAZARD MITIGATION ASSISTANCE GUIDANCE"]).

[48] The amount of funding that will be available for a disaster is not immediately known as it depends on the costs of the disaster. *See* 42 U.S.C. § 5170c(a); *see also* WEBER & MOORE, *supra* note 4040, at 8 (citing Robert T. Stafford Disaster Relief and Emergency Assistance Act § 404 (codified as amended at 42 U.S.C. § 5170c (2018)).

[49] WEBER & MOORE, *supra* note 40, at 8.

[50] FED. EMERGENCY MGMT. AGENCY, HAZARD MITIGATION GRANT PROGRAM (HMGP) PHASES FOR STATE, TRIBAL, TERRITORY, AND LOCAL APPLICANTS 3, https://www.fema.gov/media-library-data/1492192425001-7bee4f1e7dfde07f83e4f9b81a5441db/HMGP_ProjectTips_SLT_13APRIL17_508.pdf (last visited June 28, 2020).

[51] 42 U.S.C. § 5170c; 44 C.F.R. § 206.432(c); *see also* FED. EMERGENCY MGMT. AGENCY, HAZARD MITIGATION ASSISTANCE COST SHARE GUIDE FOR APPLICANTS, SUBAPPLICANTS, AND FEMA 1-1 (2016), https://www.fema.gov/media-library-data/1463766664964-4e6dd22652cb7c8a6162904f3b1b2022/FinalHMACostShareGuide508.pdf [hereinafter "HAZARD MITIGATION ASSISTANCE COST SHARE GUIDE"]; WEBER & MOORE, *supra* note 40, at 8.

[52] 42 U.S.C. § 5170c(e); HAZARD MITIGATION ASSISTANCE GUIDANCE, *supra* note 47, at 108-09.

[53] WEBER & MOORE, *supra* note 40, at 8 ("[I]t is unclear how often states and communities take advantage of this Advance Assistance.").

[54] HAZARD MITIGATION ASSISTANCE GUIDANCE, *supra* note 47, at 108.

If FEMA approves an application, an HMGP grant is awarded to the applying state, territory, or tribe, which then disburses the funds to sub-applicants.[55] After receiving funding, local governments remain responsible for conducting property appraisals and title searches, making offers and completing the closing process, arranging for the demolition of properties within ninety days of closing, and dealing with hazardous materials, waste disposal, and landscaping and restoration work.[56] Additionally, localities must maintain the land as open space after a buyout.[57]

While the majority of federal buyouts are conducted with HMGP funding, critics have voiced a variety of concerns about the HMGP buyout process. One prominent concern is how long a HMGP buyout usually takes, a process which averages 5.7 years from disaster to closing on a property.[58] Such delays adversely impact individuals who need to repair their homes in the meantime, or whose homes flood again while they are waiting for the buyout process to finish.[59] These timeframe concerns are also sometimes closely correlated to issues of social justice. Traditionally, due to redlining,[60] flood-prone areas are more likely to house low-income individuals.[61] "Especially in inland locations, low-income communities and communities of color are likely to experience higher flood risk due to lower-lying elevations and/or underinvestment in flood mitigation infrastructure,"[62] whereas coastal areas are home to both low-income communities and affluent whites.[63] Although low-income individuals may be disproportionately impacted by flooding, they are also less likely to be able to afford to wait for a buyout.[64] Additionally, even if individuals are interested in participating in a buyout, they may not hear about the option of a buyout until months after the flood, when they already have received NFIP

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[55] *See* HOMEOWNER'S GUIDE TO THE HAZARD MITIGATION GRANT PROGRAM, *supra* note 47.
[56] 44 C.F.R. § 80.17(a)-(e).
[57] 44 C.F.R. § 80.19(a). For a graphic illustration of the buyout process *see* WEBER & MOORE, *supra* note 40, at 7.
[58] Mach et al., *supra* note 39, at 4.
[59] WEBER & MOORE, *supra* note 40, at 14.
[60] Beginning in the 1930s, and continuing until the Fair Housing Act in 1968, the Federal Housing Administration, which underwrites mortgages, adopted appraisal standards that "systematically disadvantaged African American and low-income urban inhabitants and severely limited their ability to obtain mortgages." Louis Lee Woods II, *The Federal Home Loan Bank Board, Redlining, and the National Proliferation of Racial Lending Discrimination, 1921-50*, 38 J. URB. HIST. 1036, 1039 (2012). The term "redlining" "refers to the presumed practice of mortgage lenders of drawing red lines around portions of a map to indicate areas or neighborhoods in which they do not want to make loans." FED. RESERVE, FEDERAL FAIR LENDING REGULATIONS AND STATUTES FAIR HOUSING ACT 1, https://www.federalreserve.gov/boarddocs/supmanual/cch/fair_lend_fhact.pdf (last visited June 28, 2020); *see also* Tracy Jan, *Redlining Was Banned 50 Years Ago. It's Still Hurting Minorities Today.*, WASH. POST (Mar. 28, 2018, 6:00 AM), https://www.washingtonpost.com/news/wonk/wp/2018/03/28/redlining-was-banned-50-years-ago-its-still-hurting-minorities-today/.
[61] WEBER & MOORE, *supra* note 40, at 14.
[62] *Id.* (emphasis added) (citing Marilyn C. Montgomery & Jayajit Chakraborty, *Assessing the Environmental Justice Consequences of Flood Risk: A Case Study in Miami, Florida*, 10 ENV'T RES. LETTERS, Sept. 1, 2015, https://iopscience.iop.org/article/10.1088/1748-9326/10/9/095010/pdf; Jeremy Deaton, *Hurricane Harvey Hit Low-Income Communities Hardest*, THINK PROGRESS (Sept. 1, 2017, 1:35 PM), https://archive.thinkprogress.org/hurricane-harvey-hit-low-income-communities-hardest-6d13506b7e60/; Brentin Mock, *Zoned for Displacement*, CITYLAB (Sept. 13, 2017 8:09 AM), https://www.bloomberg.com/news/articles/2017-09-13/displaced-by-hurricane-harvey-by-design).
[63] Siders, *supra* note 11, at 216 ("[T]he US coast is both a playground for the wealthy and home to some of the most disadvantaged and historically marginalized people in the nation.").
[64] WEBER & MOORE, *supra* note 40, at 8, 14.

insurance money and begun rebuilding.[65] Lastly, to date, richer, more densely populated areas are more likely to implement *voluntary* buyouts.[66] Several factors may contribute to this trend, such as the fact that local governments must have the financial ability to assist with a buyout and must also be capable of "navigat[ing] the FEMA grant application process, procur[ing] additional funds, administer[ing] the process, and relocat[ing] participating property owners and residents."[67] Wealthier areas may also have city planners or resilience officers who are aware of the risks posed by climate change and elected officials who have the political will to engage in a buyout process.[68]

As HMGP funding requires a cost share of twenty-five percent from applicants, communities commonly supplement HMGP funding for buyouts with Community Development Block Grants-Disaster Recovery (CDBG-DR) funding from the United States Department of Housing and Urban Development (HUD).[69] Like HMPG funding, CDBG-DR funding is only available after a presidential declaration of a major disaster and requires that Congress approve CDBG-DR appropriations.[70] HUD then calculates allocations, publishes a notice in the Federal Register, and awards funds to state or local governments by establishing accounts in the Disaster Recovery Grant Reporting (DRGR) system that the grantee can access.[71] State and local governments can administer these funds directly or distribute them to subrecipients.[72] The use of CDBG-DR funds has increased over the years, from less than $1 billion in 2001 to more than $8 billion in 2013.[73] Thus, CDBG-DR funds fill a crucial fiscal gap.

Although HMGP and CDBG-DR funding are often used together to conduct buyouts following flooding, the two programs differ in their requirements. In order to qualify for FEMA funding a project must be "environmentally sound, cost effective, and reduce future risk."[74] Cost-effectiveness is generally determined based on a cost-benefit analysis, although an expedited methodology is available under certain conditions.[75] HUD funding criteria, on the other hand, require that a project "benefit low- or moderate-income (LMI) households, eradicate slums or blights, or address an urgent public safety need."[76] However, the requirement that 70 percent of

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[65] *Id.* at 8.
[66] Mach et al., *supra* note 39, at 5.
[67] *Id.*
[68] *Id.*
[69] *See* Siders, *supra* note 37, at 242.
[70] *See* U.S. DEP'T HOUS. & URBAN DEV. & CMTY. PLANNING & DEV., COMMUNITY DEVELOPMENT BLOCK GRANT DISASTER RECOVERY: CDBG-DR OVERVIEW 7, 19 (2020),
[71] *Id.* at 6.
[72] *Id.*
[73] *See* Kevin Fox Gotham, *Reinforcing Inequalities: The Impact of the CDBG Program on Post-Katrina Rebuilding*, 24 HOUSING POL'Y DEBATE 192, 197 (2014), https://www.researchgate.net/publication/271929615_Reinforcing_Inequalities_The_Impact_of_the_CDBG_Program_on_Post-Katrina_Rebuilding.
[74] Siders, *supra* note 37, at 242 (citing FED. EMERGENCY MGMT. AGENCY, HAZARD MITIGATION ASSISTANCE (HMA) GUIDANCE ON PROPERTY ACQUISITION AND RELOCATION FOR THE PURPOSE OF OPEN SPACE (2007), https://www.fema.gov/media-library-data/20130726-1721-25045-3264/web_page_3_acq_guidance_06_20_08.pdf).
[75] HAZARD MITIGATION ASSISTANCE GUIDANCE, *supra* note 47, at 64-65.
[76] Siders, *supra* note 37, at 242; *see also* U.S. DEP'T HOUS. & URBAN DEV. & CMTY. PLANNING & DEV., CDBG DISASTER RECOVERY FRAMEWORK, 4 (2013), https://www.hud.gov/sites/documents/CDBG_TRAINING_2_2_13.PDF.

funds be used to benefit LMI households is generally reduced during post-disaster funding,[77] despite concerns about this effect on LMI individuals.[78] Another significant difference is that HMGP funding requires programs to pay pre-disaster fair market value (FMV) for properties they acquire, while CDBG-DR funding allows programs to offer pre- or post-disaster FMV.[79] Lastly, homes that are within the 100-year floodplain and acquired using HMGP or CDBG-DR funds must be demolished and the properties maintained as open spaces. However, depending on the appropriations bill, CDBG-DR funding may be used for redevelopment outside of the 100-year floodplain.[80]

FEMA's two other HMA programs, PDM and FMA, are not dependent on a federal declaration of a disaster; rather, Congress appropriates funding annually. For example, in 2019, PDM received $250 million[81] and FMA received $210 million.[82] As with HMGP, both PDM and FMA applications are made by states, territories, or federally-recognized tribes with local governments serving as sub-applicants.[83] To be eligible for funding, an applicant must have a FEMA-approved flood risk mitigation plan.[84] Eligible projects include property acquisition and structure demolition or relocation projects.[85] The same FEMA regulations for Property Acquisition and Relocation for Open Space govern PDM and FMA property acquisition projects.[86]

The PDM program is authorized under Section 203 of the Stafford Act,[87] and is intended "to reduce overall risk to the population and structures from future hazard events, while also reducing reliance on Federal funding in future disasters."[88] PDM funding generally covers seventy-five percent of costs, but can cover up to ninety percent if an applicant or sub-applicant is a "small impoverished community."[89] Thus, applicants must generally contribute a cost share of twenty-five percent, which can be reduced to ten percent for small, impoverished communities. PDM funding is available to applicants to use for property acquisition, as well as other preemptive measures, such as elevating structures.[90] Up to ten percent of PDM funding can also be used for

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[77] Gotham, *supra* note 73, at 196; Siders, *supra* note 37, at 242.
[78] Siders, *supra* note 37, at 242.
[79] *Id*. For a critique of HUD's use of pre-disaster FMV *see* Gotham, *supra* note 73, at 207.
[80] Siders, *supra* note 37, at 242. Regular CDBG funds do not have such restrictions. *Id.*
[81] FED. EMERGENCY MGMT. AGENCY, FY 2019 PRE-DISASTER MITIGATION (PDM) GRANT PROGRAM 1, https://www.fema.gov/media-library-data/1566838030892-2ce88be44262b32999aecba3e383aa05/PDMFactSheetFY19Aug2019.pdf (last visited June 29, 2020).
[82] FED. EMERGENCY MGMT. AGENCY, FY 2019 FLOOD MITIGATION ASSISTANCE (FMA) GRANT PROGRAM 2, https://www.fema.gov/media-library-data/1578520288733-d372d995bdbb6aea6c88ed39636138fb/FMAFactSheetFY19_1.8.20.pdf (last visited June 29, 2020).
[83] *Flood Mitigation Assistance Grant Program*, FED. EMERGENCY MGMT. AGENCY, https://www.fema.gov/flood-mitigation-assistance-grant-program (last visited June 29, 2020); *Pre-Disaster Mitigation Grant Program*, FED. EMERGENCY MGMT. AGENCY (last visited Apr. 4, 2020), https://www.fema.gov/pre-disaster-mitigation-grant-program.
[84] 42 U.S.C. § 4104c(b); *see also* FLOODPLAIN BUYOUTS, *supra* note 41, at 10.
[85] *See* 42 U.S.C. § 4104c(c)(3).
[86] *See* 44 C.F.R. § 80.
[87] Robert T. Stafford Disaster Relief and Emergency Assistance Act § 203, 42 U.S.C. § 5133 (2018).
[88] HAZARD MITIGATION ASSISTANCE GUIDANCE, *supra* note 47, at 4.
[89] 42 U.S. Code § 5133(h); *see also* HAZARD MITIGATION ASSISTANCE COST SHARE GUIDE 1-1, *supra* note 51.
[90] HAZARD MITIGATION ASSISTANCE GUIDANCE, *supra* note 47, at 33.

information dissemination related to the proposed project, such as public education efforts.[91] States, tribes located within states, and territories are eligible for PDM funding if the state or territory has received a major disaster declaration within the last seven years.[92] Additionally, PDM proposals are reviewed according to a range of criteria, including "the extent and nature of the hazards to be mitigated" and "the degree of commitment of the State or local government to reduce damages from future natural disasters."[93]

The FMA program is authorized by Section 1366 of the National Flood Insurance Act of 1968, as amended,[94] and is intended to reduce or eliminate claims under the NFIP.[95] The National Flood Insurance Reform Act (NFIRA)[96] created the FMA in 1994 and the Biggert-Waters Flood Insurance Reform Act of 2012[97] further expanded the FMA by consolidating the Repetitive Flood Claims[98] and Severe Repetitive Loss[99] grant programs into the FMA.[100] The National Flood Insurance Fund (NFIF) funds FMA for flood mitigation projects and plan development.[101] Flood mitigation projects can include, among other actions, property acquisition and demolition or relocation, structure elevation, and mitigation reconstruction.[102] Property acquired through the FMA may be maintained for "public use, as the Administrator determines is consistent with sound land management and use in such area."[103] Plan development includes assessing flood risks and preparing plans to mitigate flood risk.[104] To qualify for FMA funding, properties must be "NFIP-insured at the time of the application submittal and prior to the period of availability or application start date" and maintain flood insurance through the life of the property.[105] A property may be eligible for a reduced cost share requirement, with the government providing ninety to 100 percent of the funding, if it meets the definition of a repetitive loss property (RL) or severe repetitive loss (SRL) property (consistent with Biggert-Waters Flood Insurance Reform Act of 2012).[106] These

[91] *Id.* at 114.
[92] 42 U.S.C. § 5133(g).
[93] 42 U.S.C. § 5133(g)(1)-(2).
[94] National Flood Insurance Act of 1968, 42 U.S.C. § 4001- 4129 (2012).
[95] HAZARD MITIGATION ASSISTANCE GUIDANCE, *supra* note 47, at 5.
[96] National Flood Insurance Reform Act of 1994, Pub. L. No. 103-325, 108 Stat. 2255 (1994) (codified as amended in scattered sections of 42 U.S.C.).
[97] Biggert-Waters Flood Insurance Reform Act, Pub. L. No. 112-141, 126 Stat. 916 (2012) (codified in scattered sections of 42 U.S.C.).
[98] National Flood Insurance Act of 1968 § 1323, 42 U.S.C. § 4030 (repealed 1994).
[99] National Flood Insurance Act of 1968 § 1361a, 42 U.S.C. § 4102a (repealed 1994).
[100] HAZARD MITIGATION ASSISTANCE GUIDANCE, *supra* note 47, at 5.
[101] *Id.*
[102] *Id.* at 33.
[103] 42 U.S.C. § 4104c(3)(c).
[104] 44 C.F.R. § 78.1(b).
[105] HAZARD MITIGATION ASSISTANCE GUIDANCE, *supra* note 47, at 116.
[106] *See id.*; *see also* HAZARD MITIGATION ASSISTANCE COST SHARE GUIDE, *supra* note 51, at 1-1 (showing that the government can cover ninety percent of RL and 100 percent of SRL properties). For the purposes of FMA, an RL property is a structure covered under the NFIP that "(a) [h]as incurred flood-related damage on 2 occasions, in which the cost of the repair, on the average, equaled or exceeded 25 percent of the market value of the structure at the time of each such flood event and (b) [a]t the time of the second incidence of flood-related damage, the contract for flood insurance contains increased cost of compliance coverage." HAZARD MITIGATION ASSISTANCE GUIDANCE, *supra* note 47, at 116. "A [SRL] property is a structure that:

(a) Is covered under a contract for flood insurance made available under the NFIP
(b) Has incurred flood related damage –

federal funding sources can be a valuable asset for localities looking to engage in managed retreat, particularly LMI communities who may, in some cases, be eligible for a reduced cost-share.

2. State Programs

Some states have proactively assisted relocating LMI communities faced with repetitive flooding through buyout programs. In 1987, the Minnesota legislature enacted the Flood Damage Reduction Grant Assistance Program, administered by the Minnesota Department of Natural Resources, to help such communities mitigate flooding.[107] Minnesota appropriates funds that match fifty percent of the cost of flood mitigation projects, including elevating homes and "structural acquisition in the 100-year floodplain."[108] A similar grant program in Washington was created to support local buyout programs there. Since 2013, the Washington State Legislature has appropriated $115 million to create the Department of Ecology's Floodplain by Design grant program.[109] As of 2018, this program has funded the preservation of 500 acres of land for agricultural use and funded the buyout of 700 properties "from high-risk floodplain areas."[110]

Like Minnesota and Washington, Virginia offers grant programs to assist localities with property acquisition in flooding LMI neighborhoods. Virginia features some government-sponsored grants and funding opportunities, distinct from federal programs, that assist localities in developing relocation plans for LMI communities. The Virginia Dam Safety, Flood Prevention and Protection Assistance Fund, established in section 10.1-603.17 of the Code of Virginia, provides grants for projects if they receive a fifty percent match by the applicant.[111] This non-reverting, permanent fund is administered by the Virginia Resource Authority in partnership with Virginia's Department of Conservation and Recreation.[112] The capital that supports this fund includes money "appropriated by the General Assembly, assessments made on flood insurance premium income pursuant to [section] 38.2-401.1 of the Code of Virginia, funds returned in the form of interest and loan principal by recipients of funding, income from the investment of monies contained in the fund, and other public and private funds eligible for deposit."[113] Additionally, through this same fund, the state matches fifty percent of the cost of flood protection or mitigation projects, like property acquisitions, that are conducted using locality funds by providing grants or

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> (i) For which 4 or more separate claims payments (includes building and contents) have been made under flood insurance coverage with the amount of each such claim exceeding $5,000, and with the cumulative amount of such claims payments exceeding $20,000 or (ii) For which at least 2 separate claims payments (includes only building) have been made under such coverage, with the cumulative amount of such claims exceeding the market value of the insured structure." *Id.*

[107] *See* MINN. DEP'T OF NAT. RES., FLOOD DAMAGE REDUCTION ASSISTANCE PROGRAM (2011), https://files.dnr.state.mn.us/publications/waters/fdr_grant_assistance_program.pdf.
[108] *Id.*
[109] *See Our Impact*, FLOODPLAINS BY DESIGN, http://www.floodplainsbydesign.org/impact/ (last visited June 29, 2020).
[110] *Id.*
[111] *See* VA. DEP'T OF CONSERVATION & RECREATION, 2020 GRANT MANUAL FOR THE VIRGINIA DAM SAFETY, FLOOD PREVENTION AND PROTECTION ASSISTANCE FUND 3 (2019), https://www.dcr.virginia.gov/form/DCR199-219.pdf.
[112] *Id.*
[113] *Id.* (italicized in original).

loans.[114] Finally, the Virginia Department of Emergency Management offers grants for localities and state agencies to use in preparation for flooding.[115]

Most relocation projects in Virginia, however, have been funded by a combination of federal and state grants. For instance, after Hurricane Isabel devastated Virginia in 2003, Gloucester County launched a voluntary property acquisition program that initially achieved success.[116] The County used local, state, and federal funds to elevate homes and acquire properties destroyed by flooding.[117] Gloucester received thirty-four percent of all state funding from the HMGP for these relocation and elevation projects, totaling $331,594.[118] Federal funding through FEMA to support these projects was roughly $5.4 million.[119] In 2014 the Gloucester Board of Supervisors commented that they "should not be in the real estate business," and made clear their intention not to purchase new properties, but this example still illustrates how localities can work with state and federal partners to achieve success funding relocation projects.[120]

One federal-state partnership from another coastal state exemplifies a larger-scale buyout program that achieved even more success. The New Jersey Department of Environmental Protection's (NJDEP) Blue Acres Buyout Program (Program) was launched in May 2013 after Superstorm Sandy devastated the New Jersey shoreline and riverine neighborhoods.[121] This Program was developed as an extension to NJDEP's preexisting Green Acres Program, which was designed to conserve open space in New Jersey.[122] FEMA, the New Jersey Office of Emergency Management, and the NJDEP jointly administer the Program.[123] The main objective of the Program is for the NJDEP to purchase bundles of properties in coastal and riverine communities that were severely damaged from flooding by Superstorm Sandy.[124] The eligible areas for acquisition also include communities near bay shores and tributaries severely impacted by Superstorm Sandy.[125] Following a voluntary agreement with the property owner, these properties are purchased, the structures razed, and the land is "permanently preserved as open space,

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[114] *See Virginia's Floodplain Management Program*, VA. DEP'T CONSERVATION & RECREATION, https://www.dcr.virginia.gov/dam-safety-and-floodplains/fpelemnz (last visited June 29, 2020).
[115] *See* VA. SILVER JACKETS, VIRGINIA FLOOD RISK GUIDE FOR LOCAL OFFICIALS 32 (2019), https://www.dcr.virginia.gov/dam-safety-and-floodplains/document/fp-va-silver-jackets-guide.pdf.
[116] *See Adaptation Stories: Managed Retreat*, ADAPT VA., https://vims-wm.maps.arcgis.com/apps/MapJournal/index.html?appid=bea8d4142fcf47bc90078e845e296d64# (last visited June 29, 2020) (under "Property Buyout: Gloucester, Virginia").
[117] *See id.*
[118] *See* MIDDLE PENINSULA PLANNING DIST. COMM'N, MIDDLE PENINSULA ALL HAZARDS MITIGATION PLAN 276 (2016), https://www.mppdc.com/articles/reports/AHMP_2016_FEMA_Approved_RED.pdf.
[119] *See* Fed. Emergency Mgmt. Agency, Gloucester County Hazard Mitigation Program: Full Mitigation Best Practice Story 2 (2011), https://www.hsdl.org/?abstract&did=12227.
[120] GLOUCESTER CTY., BOARD OF SUPERVISORS MEETING 18 (Dec. 2, 2014), https://gloucester.granicus.com/DocumentViewer.php?file=gloucester_3df5ff7a-6889-4a38-a341-f87bcd754072.pdf&view=1.
[121] *See Blue Acres Buyout Program*, N.J. DEP'T CONSUMER AFF., https://www.renewjerseystronger.org/homeowners/blue-acres-buyout-program/ (last visited June 30, 2020).
[122] *See* N.J. DEP'T OF ENVT'L PROT., FREQUENTLY ASKED QUESTIONS: NJDEP SUPERSTORM SANDY BLUE ACRES BUYOUT PROGRAM 1 (2015), https://www.nj.gov/dep/greenacres/pdf/faqs-blueacres.pdf.
[123] *See id.* at 2.
[124] *See id.* at 1.
[125] *See id.*

accessible to the public, for recreation or conservation."[126] The NJDEP even incentivized property owners to sell their homes by offering eligible residents the pre-storm market value of their properties before October 29, 2012.[127] As of February 2019, the Program had received $375 million in state and federal funding.[128] Importantly, seventy-five percent of this Program is funded through HMGP and the remaining twenty-five percent is funded by the state-run Blue Acres Buyout Program through appropriation.[129] Moreover, certain LMI communities who participate in this program may be eligible for relocation assistance.

Under Section 104(d) of the Housing and Development Act of 1974 ("HDA"), New Jersey is required to "replace housing available to low and moderate-income persons" who elect for the NJDEP to purchase their properties.[130] New Jersey's Department of Consumer Affairs is tasked with managing Community Development Block Grant Disaster Recovery funds to comply with the HDA.[131] Following the purchase of properties inhabited by LMI citizens under the Program, New Jersey is required to submit information to the U.S. Department of Housing and Urban Development "related to the demolition and replacement of housing units on a one-for-one basis since the units purchased will no longer be available to low and moderate-income persons."[132] For instance, New Jersey was required to replace eight dwellings on a one-for-one basis after the acquisition of nine residential homes in Pleasantville City to remain in compliance with the HDA.[133]

Overall, as of September 2019, roughly 1000 homes in total have been purchased through this Program and there are proposals for the acquisition of hundreds more.[134] The Program has been recognized by FEMA as a "'National Best Practice'" and, therefore, localities or state governments seeking to implement their own buyout programs should look to New Jersey as a model for success.[135]

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[126] *Id.*
[127] *Id.* at 3; N.J. DEP'T OF CONSUMER AFFAIRS, SANDY BLUE ACRES BUYOUT PROGRAM CDBG-DR FUNDED BUYOUTS 5 (2019), https://www.renewjerseystronger.org/wp-content/uploads/2019/06/One-for-One-Replacement-Policy-Blue-Acres_-Pleasantville.pdf.
[128] *See* OFFICE OF PLANNING, COASTAL ZONE MGMT. PROGRAM, ASSESSING THE FEASIBILITY & IMPLICATIONS OF MANAGED RETREAT STRATEGIES FOR VULNERABLE COASTAL AREAS IN HAWAI'I FINAL REPORT 39 (2019), http://files.hawaii.gov/dbedt/op/czm/ormp/assessing_the_feasibility_and_implications_of_managed_retreat_strategies_for_vulnerable_coastal_areas_in_hawaii.pdf.
[129] *See* N.J. DEP'T OF ENVT'L PROT., *supra* note 122, at 2.
[130] *See* N.J. DEP'T OF CONSUMER AFFAIRS, *supra* note 127, at 2.
[131] *Id.*
[132] *Id.*
[133] *See id.* at 6.
[134] Anna Weber, *Blueprint of a Buyout: Blue Acres Program, NJ*, NAT. RESOURCES DEF. COUNCIL (Sept. 26, 2019), https://www.nrdc.org/experts/anna-weber/blueprint-buyout-blue-acres-program-nj.
[135] *Blue Acres Buyout Program*, *supra* note 121.

III. CASE STUDIES

A. Rural

Addressing and understanding what will happen in rural areas and smaller towns as waters rise and the climate changes is increasingly important. In Virginia, like elsewhere, many of the impacts of climate change and sea level rise will impact privately-owned rural land where "existing knowledge is insufficient to best inform public and private decisions regarding the encroachment of wetlands into farmland and forests."[136]

1. Relocation Programs

Some of the "first Americans to be relocated because of the effects of climate change" will be from the village of Newtok, Alaska.[137] Describing the potential impact of sea level rise on his community, the Chief of the Grand Caillou and Dulac Band, Shirell Parfait-Dardar, explained that his community could be gone in twenty years—a loss of his homeland, culture and identity.[138] Unlike tribal land in the lower forty-eight states, Alaskan tribes do not have reservations and their lands are not held in trust. Instead, native claims were extinguished by the Alaska Native Claims Settlement Act and their land was transferred to native corporations.[139] "According to the U.S. Army Corps of Engineers, [thirty-one] Alaskan communities face imminent existential threats from coastline erosion, flooding, and other consequences of temperatures that are rising twice as quickly in the state as the global average."[140] Newtok, Alaska is a coastal village of around 400 people on the Ninglick River, near the Bering Sea.[141] At high risk of thawing permafrost and flooding, the community has been trying to get help from state and federal governments to relocate for over two decades.[142] The state of the village is increasingly dire: they currently lack any running

[136] David Malmquist, *Study Highlights Vulnerability of Rural Coast to Sea-level Rise*, VA. INST. MARINE SCI. (May 27, 2019), https://www.vims.edu/newsandevents/topstories/2019/rural_coast.php.
[137] Geof Koss, *'We Cannot Wait.' Sinking Alaska Village Finds New Home*, E&E NEWS (Sept. 4, 2019), https://www.eenews.net/stories/1061110713.
[138] Nick Martin, *America's Climate Refugees Are Pleading for Help. The Government Has No Answer.*, NEW REPUBLIC (Jan. 24, 2020), https://newrepublic.com/article/156299/americas-climate-refugees-pleading-help-government-no-answer. *See Native Vill. of Kivalina v. ExxonMobil Corp.*, 696 F.3d 849 (9th Cir. 2012).
[139] 43 U.S.C. §§ 1601-29 (2018).
[140] Oliver Milman, *Alaska Towns at Risk from Rising Seas Sound Alarm*, CLIMATE CENTRAL (Aug. 15, 2017), https://www.climatesignals.org/headlines/alaska-towns-risk-rising-seas-sound-alarm.
[141] The New York Times reported on Newtok's vulnerability to climate change in 2007. William Yardley, *Victim of Climate Change, a Town Seeks a Lifeline*, N.Y. TIMES (May 27, 2007), https://www.nytimes.com/2007/05/27/us/27newtok.html. *See also* Craig Welch, *Climate Change Has Finally Caught Up to This Alaska Village*, NAT'L GEOGRAPHIC (Oct. 22, 2019), https://www.nationalgeographic.com/science/2019/10/climate-change-finally-caught-up-to-this-alaska-village/.
[142] *See* Koss, *supra* note 137.

water or working toilets, instead relying on buckets and the river.[143] Illness from the lack of sanitation is common.[144]

The cost to totally relocate the small village of 400 residents is estimated to be over $100 million.[145] To date, the Denali Commission, an independent federal agency tasked with providing critical utilities, infrastructure, and economic support throughout Alaska,[146] has funded $27.4 million to help move the village to Mertarvik, and for other relocation support services.[147] FEMA's HMGP has provided another $1.7 million.[148]

Despite actively seeking funding to try and relocate, there have been major setbacks.[149] In addition to being an isolated Alaskan village, administrative and political struggles, bureaucratic mismanagement, and instability in tribal leadership have lost the village millions of dollars that could have funded the relocation effort.[150] Ultimately the village has been forced to rely on novel funding mechanisms, none of which has been enough, all while slowly sinking and with conditions worsening. Newtok's experience showcases the fact that even in communities that embrace relocation, issues abound. For example, overpromising can lead to a lack of trust in community leaders, there is never enough money, and federal government programs like FEMA's HMGP will not save small communities.

2. Flooding in England

Like Virginia, the UK has a very high coastline to area ratio[151] and a high risk of flooding. Although England's economy is several times larger than Virginia's, the GDP per capita of Virginia is actually greater than that of England.[152] It is estimated that one in six properties in

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[143] Greg Kim, *Residents of an Eroded Alaskan Village Are Pioneering a New One, in Phases*, NAT'L PUB. RADIO (Nov. 2, 2019), https://www.npr.org/2019/11/02/774791091/residents-of-an-eroded-alaskan-village-are-pioneering-a-new-one-in-phases.

[144] Koss, *supra* note 137. When Senator Lisa Murkowski visited in 2019, she was warned not to stray off the boardwalk between the houses lest she sink into waist-deep mud. *Id.*

[145] *See id.*

[146] *Denali Commission Story*, DENALI COMMISSION, https://www.denali.gov (last visited June 30, 2020).

[147] DENALI COMM'N, VILLAGE INFRASTRUCTURE PROTECTION PROGRAM 3 (2019), https://www.denali.gov/wp-content/uploads/2019/03/VIP-fact-sheet-web.pdf.

[148] Rachel Waldholz, *Feds Approve $1.7M to Buy Out Homes in Newtok*, ALASKA PUB. MEDIA (Mar. 20, 2018), https://www.alaskapublic.org/2018/03/20/feds-approve-1-7m-to-buy-out-homes-in-newtok/.

[149] Rachel Waldholz, *Alaskan Village, Citing Climate Change, Seeks Disaster Relief in Order to Relocate*, NAT'L PUB. RADIO (Jan. 10, 2017), https://www.npr.org/2017/01/10/509176361/alaskan-village-citing-climate-change-seeks-disaster-relief-in-order-to-relocate.

[150] Kim, *supra* note 143 (as Tribal Administrator Stanley Tom explained, "millions of dollar in grants were mismanaged and lost in the early days of the relocation process. He blames it on disagreements within the village's leadership. That led to a power struggle in which the Newtok Village Council eventually wrested control of the relocation effort from the Newtok Traditional Council. During that time of instability, funding stalled for years.").

[151] The UK Ordinance Survey's official measure for the coastline of Great Britain is 17,820 km (11,072.8 miles). Gemma, *Which English county has the longest coastline?*, ORDINANCE SURVEY (Jan. 25, 2017), https://www.ordnancesurvey.co.uk/blog/2017/01/english-county-longest-coastline/.

[152] *See* OFFICE FOR NAT'L STATISTICS, REGIONAL ECONOMIC ACTIVITY BY GROSS DOMESTIC PRODUCT, UK: 1998 TO 2018 (2019); *Population Estimates for the UK, England and Wales, Scotland and Northern Ireland: Mid-2018*, OFFICE FOR NAT'L STATISTICS (June 26, 2019), https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/populationestimates/bulletins/ann

England is at risk of flooding.[153] A half meter of sea level rise (1.64 feet) will make approximately 20 percent of English coastal defense systems more likely to fail.[154] These defenses range from seawalls or berms in small coastal towns to the Thames Barrier, which protects 1.3 million people and £275 billion ($341 billion) in property and infrastructure.[155]

In 1991, the UK pursued a small managed retreat pilot project in Essex. The project focused on the removal of sea walls and hard defenses and replaced them with salt marsh, but did not physically displace people and was on publicly owned land.[156] Since then, there have been multiple programs to deal with flood risk, from large scale realignment schemes to countrywide threat surveys to identify high flood risk areas and develop resiliency plans. To date, however, many of the programs in the UK have focused on realignment or retreat of physical property that is often uninhabited; since there is no NFIP equivalent, or duty to defend under the common law, for many people who lose their homes due to erosion, flooding, and sea-level rise the only government funding awarded is a small grant to cover demolition costs.[157]

There are multiple levels of governance applicable to projects in the UK. Since the case studies discussed in this paper occurred before Brexit,[158] European Union (EU) policies and laws have impacted the projects. The European Commission (EC) passes directives, which are then binding on member states and often passed as domestic legislation, like federal legislation in the United States. Parliament then implemented the EU Floods Directive (2007/60/EC) domestically in the UK as "the Flood Risk Regulations of 2009."[159] The Directive requires states to assess all the rivers and coastlines for flood risk, identify assets, and take adequate and coordinated measures to "reduce this flood risk."[160] Following a wider trend in the UK, these regulations require many

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ualmidyearpopulationestimates/mid2018#englands-population-continued-to-grow-at-a-faster-rate-than-the-rest-of-the-uk-in-mid-2018; *QuickFacts Virgini*a, U.S. CENSUS BUREAU, https://www.census.gov/quickfacts/VA (last visited June 30, 2020); *Regional Data GDP and Personal Income*, BUREAU ECON. ANALYSIS, https://apps.bea.gov/itable/iTable.cfm?ReqID=70&step=1#reqid=70&step=1&isuri=1 (last visited June 30, 2020).

[153] SARA PRIESTLE, FLOOD RISK MANAGEMENT AND FUNDING 16 (2017), *available at* https://commonslibrary.parliament.uk/research-briefings/cbp-7514/.

[154] COMM. ON CLIMATE CHANGE, MANAGING THE COAST IN A CHANGING CLIMATE 9 (2018), https://www.theccc.org.uk/wp-content/uploads/2018/10/Managing-the-coast-in-a-changing-climate-October-2018.pdf.

[155] *See* Env't Agency, *The Thames Barrier*, GOV.UK (April 25, 2014), https://www.gov.uk/guidance/the-thames-barrier; *12 Great Examples of How Countries Are Adapting to Climate Change*, GLOBAL COMMISSION ON ADAPTATION (Sept. 17, 2019), https://gca.org/global-commission-on-adaptation/solutions/12-great-examples-of-how-countries-are-adapting-to-climate-change.

[156] *See* ENGLISH NATURE & UNIV. OF HULL INST. OF ESTUARINE & COASTAL STUDIES, NORTHEY ISLAND MANAGED RETREAT REPORT 4: OVERVIEW TO FEBRUARY 1994 (1994), *available at* http://publications.naturalengland.org.uk/publication/62067 (it was decided by the National Trust (the land owner), the National Rivers Authority and English Nature to commission the Institute of Estuarine and Coastal Studies to undertake and monitor the project).

[157] Damian Carrington, *Almost 7,000 UK Properties to Be Sacrificed to Rising Seas*, THE GUARDIAN (Dec. 28, 2014), https://www.theguardian.com/environment/2014/dec/28/7000-uk-properties-sacrificed-rising-seas-coastal-erosion.

[158] "Brexit" is the term commonly used for the British Exit from the European Union.

[159] DEP'T FOR ENV'T, FOOD & RURAL AFFAIRS, EXPLANATORY MEMORANDUM TO THE FLOOD RISK REGULATIONS 2009 1 (2009), http://www.legislation.gov.uk/uksi/2009/3042/pdfs/uksiem_20093042_en.pdf.

[160] *Id*. at 4.

of the assessments to be implemented at the local level.[161] The UK coast is split into regional cells that have developed twenty-two regional shoreline management plans (SMPs) . SMPs "identify the most sustainable approach to managing the flood and coastal erosion risks to the coastline in the: short-term (0 to 20 years), medium term (20 to 50 years), and long term (50 to 100 years)."[162] Within each of these shoreline regions, coastal areas fall into one of four overarching policy types: (1) no intervention, (2) hold the line, (3) managed realignment, and (4) advance the line.[163] However, these preferred management policies have no funding obligation, and if no funding can be obtained, then the policy in essence defaults to no intervention.[164]

For multiple reasons, including the inherently negative tones of "managed retreat," the UK generally prefers to refer to the third policy type—the process of moving away from recurrently flooded areas—as "managed realignment."[165] Coastal defense projects in the UK are managed by the Environmental Agency[166] (EA), within the Department for Environment, Food and Rural Affairs (DEFRA). The EA has authority, but no statutory obligation or duty, to manage flood risks, and generally there is no government compensation for homes lost to flooding or coastal erosion.[167] The EA is funded through discretionary grant-in-aid funding from DEFRA that Parliament appropriates. Under the EA there are also regional flood committees, local flood authorities, local governments, and internal drainage boards. The specific responsibilities and powers of each is relatively unclear, even to Parliament.[168] While private insurance is available, the UK has no equivalent of the NFIP. Under British common law, riparian property owners have the responsibility to protect their own property against flooding, not the government.[169] Private flood

[161] Under the regulation "all Unitary Authorities, and in two-tier systems, all County Councils, are designated a Local Lead Flood Authority (LLFA) and have formally been allocated a number of key responsibilities with respect to local flood risk management." W. SUSSEX CTY. COUNCIL, WEST SUSSEX PRELIMINARY FLOOD RISK ASSESSMENT 1 (2011), *available at* https://www.westsussex.gov.uk/media/1626/west_sussex_pfra.pdf.

[162] Env't Agency, *Shoreline Management Plans (SMPs)*, GOV.UK (March 11, 2009), https://www.gov.uk/government/publications/shoreline-management-plans-smps.

[163] DEP'T FOR ENV'T, FOOD & RURAL AFFAIRS, SHORELINE MANAGEMENT PLAN GUIDANCE VOLUME 1: AIMS AND REQUIREMENTS 13-14 (2006), *available at* https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/69206/pb11726-smpg-vol1-060308.pdf; *Shoreline Management Plans*, EASTERN SOLENT COASTAL PARTNERSHIP, http://www.escp.org.uk/shoreline-management-plans (last visited June 30, 2020).

[164] DEP'T FOR ENV'T, FOOD & RURAL AFFAIRS, *supra* note 159, at 33.

[165] LUCIANA S. ESTEVES, MANAGED REALIGNMENT: A VIABLE LONG-TERM COASTAL MANAGEMENT STRATEGY? 23 (2014), *available at* https://www.researchgate.net/publication/261508267_Managed_realignment_A_viable_long-term_coastal_management_strategy); Env't Agency, *Medmerry Coastal Flood Defence Scheme*, GOV.UK (May 19, 2012), https://www.gov.uk/government/publications/medmerry-coastal-flood-defence-scheme/medmerry-coastal-flood-defence-scheme ("Managed realignment means building new defences inland from the coast and allowing a new 'intertidal' area to form seaward of the new defences. 'Intertidal' means the land that is exposed at low tide and covered by the sea at high tide.").

[166] An "executive non-departmental public body." PRIESTLE, *supra* note 153, at 16.

[167] *Id.*; Carrington, *supra* note 157 ("There is no statutory recourse to compensation for property lost or damaged due to coastal change.").

[168] "[T]here is a distinct lack of clarity around the responsibilities of the relevant organisations, resulting in frustration for the public and emergency responders." PRIESTLE, *supra* note 153, at 14 (quoting CABINET OFFICE, THE PITT REVIEW: LEARNING LESSONS FROM THE 2007 FLOODS 83 (2008)).

[169] PRIESTLE, *supra* note 153, at 20.

insurance backed by the government is available to homeowners,[170] but tens of thousands of high risk properties are ineligible and if uninsured property is lost to flooding or coastal change there is no duty or requirement in the UK for the government to provide assistance.[171]

3. Medmerry, England

"We've sat down, we listened to people's concerns, and we really involved the community, and for me that's the real success of this project."[172]
– Andrew Gilham, Flood and Coastal Risk Manager

Medmerry is a suburb of Selsey, a small coastal town in West Sussex on the English Channel. The area is surrounded by beaches, coastal plains, and marshland.[173] Traditionally, a shingle bank "wall" protected the western side of the town, with maintenance costing the EA £300,000 ($480,000)[174] annually and millions of pounds-sterling in repairs after post-storm breaches.[175] In 2008 the wall failed, causing over £5 million ($9.25 million) in damages.[176] Rather than continue to perpetuate this Sisyphean task of fighting the sea, the EA decided to let the ocean in.

The Medmerry scheme is the largest managed realignment project in the UK and the largest "open-coast scheme" in Europe to date.[177] The EA purposefully breached the existing defense via a 100-meter (328-foot) channel to let the ocean in to inundate 1,235 acres of land.[178] The project turned three private farms and a Royal Society for the Protection of Birds (RSPB) nature reserve into a saltwater marsh. Behind this newly created intertidal zone a seven kilometer (4.3496 mile) clay embankment was built, anchored with 60,000 tons of rock armor revetment to stabilize the

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[170] *See How FloodRE Works*, FLOODRE, https://www.floodre.co.uk/how-flood-re-works/ (last visited June 30, 2020). *But see* Josh Halliday, *Flood Insurance Cover Does Not Protect Thousands of New Homes*, THE GUARDIAN (Feb 20, 2020) https://www.theguardian.com/environment/2020/feb/21/new-homes-in-flood-risk-areas-not-covered-by-insurance-scheme (Over 70,000 homes in high risk areas built since 2009 are not eligible for coverage under Flood Re. Around 20,000 of these are not protected by any flood defences.).
[171] *Id*.
[172] EnvironmentAgencyTV, *Medmery (sic) Managed Realignment Scheme*, YOUTUBE (Nov. 1, 2013), https://www.youtube.com/watch?v=x7jemyJujg8&feature=c4-overview&list=UU8XLubOua8P9B1hT0Qb5Tbg (Andrew Gilham, Flood and Coastal Risk Manager at 4:40).
[173] Ian West, *Selsey Bill and Bracklesham Bay, Sussex: Geology of the Wessex Coast of Southern England*, UNIV. SOUTHAMPTON (Jan. 2018), http://www.southampton.ac.uk/~imw/Selsey-Bracklesham.htm.
[174] Since the conversion rate of pounds sterling to US dollars has fluctuated greatly, general figures in the paper are at the current rate, and historic events like the Medmerry project are given at average conversion rates for the year of the event or project.
[175] Rob Yarham, *Country Diary: Flood Defences Give the Birds Something to Sing About*, THE GUARDIAN (Aug. 14, 2018), https://www.theguardian.com/environment/2018/aug/14/country-diary-flood-defences-birds-medmerry-west-sussex; Ben McAlinden, *Managed Realignment at Medmerry, Sussex*, INST. CIV. ENGINEERS (Sept. 28, 2015), https://www.ice.org.uk/knowledge-and-resources/case-studies/managed-realignment-at-medmerry-sussex.
[176] McAlinden, *supra* note 175.
[177] *Id*.
[178] *Id.*; *see also* Take One Productions, *Timelapse Environment Agency Medmerry Managed Realignment Scheme*, YOUTUBE (Sept. 10, 2014), https://www.youtube.com/watch?v=EkIGACOl5lY (showing a time-lapse of the breach).

ends of the newly built defenses.[179] Around 400,000 cubic meters (14,125,866.7 cubic feet) of earth were excavated for the new banks as well as a ten kilometer-long (6.2 miles) drainage ditch, a 1.8 kilometer (1.1 mile) diversion channel, and around ten kilometers (6.2 miles) "of new footpaths, cycleways and bridleways" across the site.[180]

The project was funded by the EA, was run through a partnership with the RSPB, and is currently managed by the RSPB.[181] Team Van Oord and Jacobs were contracted, and sixty-two weeks spent on construction.[182] The EA funds projects through its grant-in-aid funding from DEFRA – once it receives funding, the Agency has discretion to either spend those funds directly or give them as grants to localities.[183]

Starting in November 2006, the EA ran a ninety-day consultation that included a project team with local engineers, public comments, exhibitions, feedback forms, and a website.[184] However, while the initial consultation satisfied the EA's legal notice requirements, it was poorly received.[185] The local community was initially opposed to the EA's plan because they feared that abandoning the existing protective structure could hurt the economy or the new plan would not work. Residents felt like birds were being prioritized over people and there was a lack of political support from local planning authorities.[186] Rather than press on, the EA created a revised engagement plan based on the failure of the initial consultation.[187] This started with a draft strategy consultation in the summer of 2008 to clarify documents, setting up a series of exhibitions and workshops, holding one-on-one meetings with community members, sending flyers and mailers to stakeholders, and providing council presentations.[188] This led to the formation of the Medmerry Stakeholder Advisory Group (MStAG), which included a wide range of community representatives who could act as liaisons between the EA and the community.[189] There was generally positive support for the second round of consultations, and the EA eventually gathered unanimous support from the local councilors for the projects.[190] After approval, the MStAG remained involved through the design phase and designs were updated to accommodate local knowledge and concerns. After this extensive consultation, several properties were bought and construction began.

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[188] McAlinden, *supra* note 175; EnvironmentAgencyTV, *supra* note 172, at 2:10.
[180] McAlinden, *supra* note 175; Env't Agency, *supra* note 162.
[181] McAlinden, *supra* note 175; *Medmerry*, ROYAL SOC'Y FOR PROTECTION BIRDS, https://www.rspb.org.uk/reserves-and-events/reserves-a-z/medmerry/ (last visited July 6, 2020); *Pagham Harbour and Medmerry*, ROYAL SOC'Y FOR PROTECTION BIRDS, https://www.rspb.org.uk/our-work/conservation/projects/pagham-harbour-and-medmerry/ (last visited July 6, 2020).
[182] McAlinden, *supra* note 175.
[183] PRIESTLE, *supra* note 153, at 16.
[184] STACIA MILLER, INVOLVING THE COMMUNITY IN A CHANGING COASTLINE: AN ENGLISH CASE STUDY (March 16, 2013), http://wsg.washington.edu/wordpress/wp-content/uploads/outreach/nwwws/A1/A1_Miller.pdf.
[185] *Id*.
[186] *Id*.
[187] *Id*.
[188] *Id*.
[189] *Id*.
[190] *Id*.

Three broad lessons came from this project.[191] First, success was reliant on close collaboration with affected stakeholders. When the community was opposed to issues, the team re-evaluated their approach and adjusted to better incorporate stakeholders. Second, early and proactive engagement with residents was critical. The team started reaching out to the community more than three years before any ground-breaking began. Finally, the formation of specialist groups to manage issues was very important for addressing stakeholder concerns. The MStAG continued to meet and give input for the project after the local community supported the project, which allowed the community to continue to give their opinions throughout the implementation phases of the project.

4. Pathfinder & Other Projects

Other flooding mitigation projects in the UK have not run as smoothly or as successfully as Medmerry. While the threats of flooding continue to increase, there has been a move in England to shift management of flood risk to the local or individual level and focus on resiliency.[192] While the shift allows for increased local decision making it has coincided with a decrease in funding.[193] DEFRA now requires localities to partially fund their own flood defenses.[194]

One DEFRA project to increase community resilience was the Flood Resilience Community Pathfinder Scheme that ran from 2013 to 2015. Pathfinder was a £5 million ($8 million) pilot project "open to all local authorities in England" to help communities improve their flood resilience and better manage flood risk.[195] Out of forty-five applications received, thirteen Pathfinder projects were funded.[196] The project was run as a grant program through DEFRA where localities could apply for specific project funding.[197] Projects ranged from studying the "best research evidence about communities and resilience"[198] to creating online toolkits,[199] or installing flood resistant modifications on high risk houses in isolated communities.[200]

The Government Evaluation Report found four key challenges for community engagement. First, when working with communities, there will be competing priorities and a lack of time because volunteering is not free, and time is not unlimited. Across the board, programs found it

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[191] *Medmerry, West Sussex Coastal Flooding*, OPPLA, https://oppla.eu/casestudy/18379 (last visited July 6, 2020) (Oppla is the EU Repository of Nature-Based Solutions).
[192] Chloe Begg et al., *Localism and Flood Risk Management in England: The Creation of New Inequalities?*, 33 ENV'T & PLAN. C: GOV'T & POL'Y 685, 685-86 (2015).
[193] *Id*. at 690.
[194] *Id*..
[195] DEP'T FOR ENV'T, FOOD & RURAL AFFAIRS, FLOOD RESILIENCE COMMUNITY PATHFINDER EVALUATION FINAL EVALUATION REPORT 8 (2015), *available at* http://randd.defra.gov.uk/Document.aspx?Document=13185_FD2664_FloodResilienceCommunityPathfinderSchemeEvaluation_FR.pdf.
[196] *Id*.
[197] *Id*. at 18.
[198] DEVON CTY. COUNCIL, FLOOD RESILIENCE COMMUNITY PATHFINDER PROJECT 9 (2015), https://nationalfloodforum.org.uk/wp-content/uploads/2017/04/Devon-Pathfinder-Community-Flood-Resilience-Report-Final.pdf.
[199] DEP'T FOR ENV'T, FOOD & RURAL AFFAIRS, *supra* note 195, at 94.
[200] *Id*. at 155.

difficult to motivate participation from communities.[201] Second, programs must be made relevant for transient populations. Third, planners must engage with people from multiple socio-economic backgrounds, not just affluent groups who are most eager to engage. A community member for one of the projects said in an interview that "[p]eople are hard to engage with largely because they have much more immediate problems to worry about."[202] Managers often found that "more affluent groups were willing to engage but there was no interest from those living in social housing." Finally, homeowners may refuse to recognize the threat of flooding due to effects on property prices – or they may actively try to hide flooding from the public.[203] One project manager found that "some that have flooded don't want this recorded and prefer to do the repairs themselves."[204]

To deal with these issues, some of the projects started with activities that developed community participation and focused on a combination of community and institution-led approaches.[205] DEPRA noted that, throughout community engagement, "it is important to recognise that awareness raising is not an endpoint in itself and to ask the question: 'What impact will this have on the wider community preparedness and ability to manage flood risk?'"[206] For example, one of the thirteen projects, Pathfinder Rochdale, had a specific focus on building social resilience in areas with low levels of economic and financial resilience.[207] The program sought to increase resources and opportunities to deliver flood resilience in low income and transient communities. "Rochdale borough is one of the most deprived areas of the country, characterized by an ethnically diverse and transient population of 211,700 people" with a high disability rate of thirty percent.[208] The Rochdale program focused on communities "at significant risk of flooding."[209] The scheme matched funds with the UK Green Deal, a program to help install energy saving improvements with flood resilience improvements to expand the projects' reach.[210] To effectively connect with the relevant communities, engagement and outreach was targeted to local mosques, scout groups, and on-the-ground charities.[211] To further improve outreach, communication materials were developed in multiple languages including English, Urdu, and Bengal.[212] The program provided flood resilience surveys and Green Deal Assessments for thirty-five properties, a series of flood roadshows, and one property/business resilience resource pack[213],

[201] *Id.* at 62.
[202] *Id*. at 63.
[203] *Id*.
[204] *Id*.
[205] *Id*. at 13.
[206] *Id*.
[207] *Id*. at 8, 25, 99, 105, 107, 150-51.
[208] *Id*. at 25. The average income is also well below the UK average, at approximately £24,000 per year ($30,000) in 2017. *Wages JSNA*, ROCHDALE BOROUGH COUNCIL, http://www.rochdale.gov.uk/joint-strategic-needs-assessment/working-well-jsna/Pages/wages-jsna.aspx (last visited July 6, 2020).
[209] DEP'T FOR ENV'T, FOOD & RURAL AFFAIRS, *supra* note 195, at 25.
[210] *Id.* at 150; *Green Deal: Energy Saving for Your Home*, GOV.UK, https://www.gov.uk/green-deal-energy-saving-measures (last visited July 6, 2020).
[211] DEP'T FOR ENV'T, FOOD & RURAL AFFAIRS, *supra* note 195, at 59, 139.
[212] *Id.* at 76.
[213] The "pack" was a flood resilience guide outlining flood risk and the "ability of community members to act effectively during a flood" with detailed guides for 300 households, and 112 businesses. *Id*. at 92. *See also* Community Council for Somerset, *Somerset Business Resilience Flood Guide*, YOUTUBE (Nov. 15, 2016),

and created a flood action group.[214] Project managers also met with 112 individual businesses, ran two business workshops, and ran local school workshops on flooding resilience. Managers described their successes as stemming from combining projects to achieve work otherwise unavailable to the community.[215]

While the UK has had some success, many of their realignment schemes or projects have been discontinued or focused only on areas where acquired property is limited to fields and farms, not homes. Outside of flood defenses, some communities are watching their homes fall into the sea and without private insurance or any schemes for relocation their only resource is a £6,000 check to fund the demolition of their destroyed property.[216] Other communities are left in limbo.[217] Displacement from the coasts due to flooding in the UK (and elsewhere) has already begun. The true effects of coastal displacement on communities are not being accurately tracked by many governments like the UK; even if a full community is not forced to move by one precipitous event or government program, flooding combined with a lack of insurance and extreme events has already begun to force people to move.[218]

Although the government structures are different in the UK, the threats and risks of flooding from sea level rise, the way that localities are impacted, and the need for government at all levels to properly engage with affected peoples are the same, and their successes can be used to help guide issues state-side. Medmerry made a point of going beyond legal requirements to involve the community in substantial ways throughout the project and changed their methods to better involve the community. Rochedale was able to use a funding opportunity, the equivalent of a federal grant, to leverage other funding resources to improve the resilience of impoverished areas with high flood risk. The project managers were able to combine local government resources, including managers and staff hours, and with increased funding they were able to undertake a wider breadth of projects. Although the pathfinder program was a one-time grant opportunity it laid groundwork for communities to build resilience schemes, and the UK government has since announced grants for individuals and business to address flooding.[219] Being flexible in response to fluctuating funding is an important lesson from these projects.

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https://www.youtube.com/watch?v=Eewas2apIac (Somerset made a YouTube video outlining their flood guide with a link to order their "Flood Guide: Business Resilience Pack.").

[214] DEP'T FOR ENV'T, FOOD & RURAL AFFAIRS, *supra* note 195, at 101, 102, 104, 106.

[215] *Id*. at 151.

[216] Damian Carrington, *supra* note 157.

[217] Tom Wall, *'This Is a Wake-up Call': The Villagers Who Could Be Britain's First Climate Refugees*, THE GUARDIAN (May 18, 2019), https://www.theguardian.com/environment/2019/may/18/this-is-a-wake-up-call-the-villagers-who-could-be-britains-first-climate-refugees.

[218] Sophie Brown, *The Impact of Displacement in the 2013/2014 Southern England Winter Floods: Resilient Communities or "Re-traumatisation by Bureaucracy"?,* 4 ST. ENVTL. MIGRATION 191, 193-94 (2014), http://labos.ulg.ac.be/hugo/wp-content/uploads/sites/38/2017/11/The-State-of-Environmental-Migration-2014-191-211.pdf.

[219] Dep't for Env't, Food & Rural Affairs, *Government Announces Grants to Help Protect Properties from Flooding*, GOV.UK (Nov. 19, 2019), https://www.gov.uk/government/news/government-announces-grants-to-help-protect-properties-from-flooding ("Flood-hit homes and businesses will be able to receive up to £5,000 to help protect them from future flooding.").

B. Suburban

1. The Riggings Condominiums Inc. v. Coastal Resources Commission

The Riggings Homeowners Association (Riggings HOA) litigation exemplifies how a legislative attempt to compel managed retreat was unsuccessful as the North Carolina judiciary was not prepared to value the public interest of retreat over the private interest to remain in place. This disconnect between legislative and judicial priorities has resulted in a North Carolina coastline currently lined with de facto sandbag revetments.

In 1985, the North Carolina Coastal Resources Commission (CRC) evaluated the effects of hardened shoreline structures, like groins or seawalls, on beaches in other states.[220] The CRC then determined that permitting hardened erosion control structures on North Carolina beaches would cause irreparable ecological damage to the shoreline.[221] Shortly afterwards, in January 1985, the CRC promulgated a rule banning these structures.[222] Numerous oceanfront communities in North Carolina have lined their shorelines with sandbags since 1985 to temporarily reduce coastal erosion.[223] This rule, however, did permit exceptions for temporary erosion control structures.[224]

In 1985, the Riggings HOA constructed forty-eight oceanfront condo units in Kure Beach.[225] They constructed a temporary erosion control structure because the project fell under one of the exceptions to the no hardened structure rule.[226] The Riggings HOA was permitted to erect sandbags because it was "immediately threatened" because the structure's "foundation . . . [was] less than twenty feet away from the erosion scarp."[227] On December 3, 1994, the Division of Coastal Management issued the Riggings HOA a general permit to repair and replace their 1985 sandbags.[228] The same general permit was issued to allow them to keep the sandbags until May 1, 2000.[229] At this time, the Riggings HOA was required to receive a variance from the CRC to maintain their sandbags.[230]

In 2003, a unanimous North Carolina General Assembly codified the no hardened structure rule, under the Coastal Area Management Act (CAMA).[231] The relevant provisions of CAMA

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[220] *See* Emily Jack, *Coastal Erosion and the Ban on Hardened Structures*, ANCHOR, https://www.ncpedia.org/anchor/coastal-erosion-and-ban-hard (last visited July 7, 2020).
[221] *See id.*
[222] N.C. DIV. COASTAL MGMT., PERMANENT EROSION CONTROL STRUCTURES, https://files.nc.gov/ncdeq/Coastal%20Management/documents/PDF/Coastal%20Resources%20Commission%20-%20Meeting%20Agendas%20-%20Minutes/agendas/Shoreline%20Hardening%20Exceptions%20Feb17.pdf (last visited July 7, 2020).
[223] *See PHOTOS: Recent History of Sandbags Along the N.C. Coast*, STARNEWS ONLINE (Feb. 8, 2017), https://www.starnewsonline.com/photogallery/NC/20170208/NEWS/208009990/PH/1?start=2.
[224] *See* 15A N.C. ADMIN. CODE 7H.0308(a)(1)-(2) (2020).
[225] Riggings Homeowners, Inc. v. Coastal Res. Comm'n, 747 S.E.2d 301, 302 (N.C. Ct. App. 2013).
[226] *See id.* at 303.
[227] 15A N.C. ADMIN. CODE 7H.0308(a)(2)(b) (2020).
[228] *See Riggings Homeowners*, 747 S.E.2d at 303.
[229] *Id.*
[230] *See id.*
[242] *See* N.C. GEN. STAT. §§ 113a-115.1(b) (2018).

prohibit any "permanent erosion control structure in an ocean shoreline" and "the construction of a temporary erosion control structure that consists of anything other than sandbags in an ocean shoreline."[232] From 2000 to 2005, the Riggings HOA received three variances from the CRC to maintain their sandbags and avoid prosecution for failure to comply with North Carolina's no hardened structure rule.[233] For the CRC to grant a variance, the petitioner must satisfy all of four elements:

1. Unnecessary hardships would result from strict application of the rules, standards or orders.
2. The hardships result from conditions that are peculiar to the property, such as the location, size, or topography of the property.
3. The hardships did not result from actions taken by the petitioner.
4. The request variance is consistent with the spirit, purpose, and intent of the rules, standards, or orders; will secure public safety and welfare; and will preserve substantial justice.[234]

On August 22, 2006, Riggings HOA applied for an additional variance for beach nourishment, called the Habitat Enrichment Project, which would remove every sandbag in front of their property if granted.[235] The CRC denied the petition because they found that Riggings HOA did not satisfy all four elements.[236] The HOA appealed this decision to the New Hanover County Superior Court, which remanded it back to the CRC with instructions for CRC to apply an "unnecessary hardships" standard.[237] After applying the new standard, the CRC still denied the variance petition.[238] Riggings HOA again appealed and the New Hanover County Superior Court held that Riggings HOA had satisfied all four elements and the CRC's decision to deny the petition was arbitrary.[239] CRC subsequently appealed this decision to the North Carolina Court of Appeals.[240]

The Court of Appeals reviewed the trial court's disposition under the lowest deference standard of review,[241] and evaluated the CRC's rationale for denying the variance request.[242] The court determined that the CRC erred when it analyzed the hardship of the property-owner rather than the property.[243] Since evaluating the hardship of the property owners could spur an Equal Protection Clause violation, the court held that Riggings HOA's "previous permit and variances are immaterial to the CRC's 'unnecessary hardships' analysis" and affirmed the trial court's

[232] *Id*.
[233] *See Riggings Homeowners,* 747 S.E.2d at 303.
[234] N.C. GEN. STAT. §§ 113a-120.1 (2008).
[235] *See Riggings Homeowners,* 747 S.E.2d at 304, 312.
[236] *Id*.
[237] Id.
[238] *Id.* at 305.
[239] Riggings Homeowners, Inc. v. Coastal Res. Comm'n, 2012 WL 12925229 (N.C. Super.) (Trial Order) at *5 (2012).
[240] *See Riggings Homeowners,* 747 S.E.2d at 305.
[241] *See id.* at 306.
[242] *See id.*
[243] *See id*. at 308.

determination that Riggings HOA satisfied the first element.[244] The court then assessed whether Riggings HOA met the fourth element explaining that the no hardened structures policy under the CAMA identified a balance between competing public and private property interests.[245] The court weighed the potential destruction of the Riggings HOA's property from erosion "against the public interests considered by the [CRC]: (i) CAMA's prohibition of permanent erosion control structures; (ii) aesthetic concerns; and (iii) public beach access."[246]

The court first emphasized that the sandbags were not permanent structures yet, and that if the planned beach nourishment Habitat Enhancement Project were successful, the sandbags would no longer be needed.[247] Second, the court highlighted that the public has plenty of opportunities to enjoy Kure Beach.[248] Finally, they stressed that the public has a minimal need to pass by the Riggings HOA's beachfront and affirmed the trial court's determination that the fourth element was satisfied.[249] The Court of Appeals affirmed the trail court's ruling and, on appeal, an evenly divided Supreme Court of North Carolina let their decision stand.[250]

Although the state of North Carolina attempted to indirectly drive residents out of eroding coastal areas by implementing a policy that prohibited long-term coastal stabilization measures, the Riggings HOA litigation shows that both the North Carolina government and communities like Riggings are "caught between a rock and a hard place."[251] If a Virginia legislative body passed a measure that banned hardened structures on Virginia's shorelines, in a similar attempt as North Carolina to eventually drive waterfront property owners away from the shore in eroding areas, the successful implementation of this measure would rest on the judiciary's interpretation of it. Like the Riggings HOA litigation, if the Virginia judiciary values the private interest to stay in place more than the legislative interest to ban hardened structures, the Virginia law would not be implemented effectively. Since the CAMA could not indirectly induce Riggings HOA to abandon their homes, the only remaining legal tools for North Carolina to compel relocation are exercising eminent domain or buying out properties through targeted acquisitions.

2. North Topsail Beach Proposed Managed Retreat Study

While managed retreat may be inevitable, many communities do not have the financial means to buyout properties, even the ones that are the most vulnerable to relative sea-level rise. One recent study, however, has demonstrated that property acquisitions in flooding LMI communities can be a fiscally wise long-term strategy. On July 1, 2019, West Carolina University's Program for the Study of Developed Shorelines released a study discussing the fiscal

[244] *Id*.
[245] *See id.* at 311.
[246] *Id.* at 312.
[247] *See id.*
[248] *See id.*
[249] *See id.*
[250] Riggings Homeowners, Inc. v. Coastal Res. Comm'n, 766 S.E.2d 320, 320 (N.C. 2014).
[251] *See Riggings Homeowners,* 747 S.E.2d at 314.

benefits of relocating the most flood-prone properties in North Topsail Beach (NTB).[252] This study specifically focused on NTB because 331 homes on Topsail Island were destroyed by Hurricane Fran in 1996.[253] Additionally, these same properties have been inundated following major hurricanes in the past two decades.[254] Once the location was determined, researchers conducted a Coastal Hazard Exposure Assessment to pinpoint the most vulnerable properties for their study.[255]

The four hazards incorporated into this assessment included erosion, inlet migration, storm surge, and flooding.[256] The datasets of these hazards were derived from FEMA, North Carolina's Department of Environmental Quality, and the National Oceanic and Atmospheric Administration.[257] The initial survey covered 2,525 parcels along 2,886 acres of land.[258] However, once the hazard data was taken into consideration, the "[f]inal results of the assessment demonstrate 290 parcels at NTB (approximately 42 acres) have the highest exposure to all hazards."[259] Fifty-seven properties were added to ensure unbroken continuity along the coast and, therefore, a total of 347 properties were evaluated for acquisition.[260] Researchers then began weighing the financial cost of relocating these homes against the financial cost of inaction.[261]

[252] W. CAROLINA UNIV., COASTAL HAZARDS & TARGETED ACQUISITIONS: A REASONABLE SHORELINE MANAGEMENT ALTERNATIVE: NORTH TOPSAIL BEACH, NORTH CAROLINA CASE STUDY 2 (July 1, 2019), https://www.coastalreview.org/wp-content/uploads/2019/07/NTB-July-1-2019.pdf.
[253] *Id.* at 4; Mark Hibbs, *Hurricane Fran: A Storm to Remember*, COASTAL R. ONLINE (Sept. 2, 2016), https://coastalreview.org/2016/09/16281/.
[254] *See* W. CAROLINA UNIV., *supra* note 252, at 4 (Hurricanes Bonnie, Irene, and Florence have caused major damage to oceanfront properties in NTB along with Hurricane Fran).
[255] *See id.* at 5.
[256] *Id.*
[257] *See Download Spatial Data & Maps (Oceanfront)*, N.C. DEP'T ENVTL. QUALITY, Download Spatial Data & Maps (Oceanfront), https://deq.nc.gov/about/divisions/coastal-management/coastal-management-data/spatial-data-maps (last visited July 8, 2020); *FEMA's National Flood Hazard Layer (NFHL) Viewer*, FED. EMERGENCY MGMT. AGENCY, https://hazards-fema.maps.arcgis.com/apps/webappviewer/index.html?id=8b0adb51996444d4879338b5529aa9cd (last visited July 8, 2020); *National Storm Surge Hazard Maps - Version 2*, NAT'L EMERGENCY OCEAN & ATMOSPHERIC ADMIN., https://www.nhc.noaa.gov/nationalsurge/#data (last visited July 8, 2020).
[258] *See* W. CAROLINA UNIV., *supra* note 252, at 5.
[259] *Id.* at 7.
[260] *See id.* at 13.
[261] *See id.*

WEST CAROLINA U., "NTB final target area for strategic retreat (all shaded properties)." *Coastal Hazards & Targeted Acquisitions: A Reasonable Shoreline Management Alternative: North Topsail Beach, North Carolina Case Study* 13 (July 1, 2019), https://www.coastalreview.org/wp-content/uploads/2019/07/NTB-July-1-2019.pdf.

According to an Onslow County evaluation in 2018, the total assessed value of the 347 properties was $30.1 million, which accounts for 3.1% of the NTB tax base.[262] Although this number appears low, thirty-two properties were valued at $100 due to inundation at the time of this study and 240 properties were small condos with an average value of $55,000.[263] The study estimates that the total revenue lost over thirty years from the removal of 347 properties ranges from $14.9 to $20.4 million.[264] Moreover, the demolition and sandbag removal costs would be around $4.25 million.[265] Therefore, the total cost of buying out these 347 properties, including appreciation and inflation, is at most $54.8 million over thirty years.[266] NTB, under its 2018 New River Inlet Master Plan, is planning to nourish 5,100 feet of shoreline biennially for three decades.[267] Since 4,000 feet of shoreline border the most-vulnerable properties demarcated in this study, the thirty-year nourishment cost would be $47.4 million.[268] Additionally, the cost of maintaining a 2,000-foot sandbag revetment for three decades ranges from $10.2 to $20.4 million.[269] Therefore, the total cost for preserving the status quo is a minimum of $57.6 million over thirty years.[270] After suggesting that the cost savings would be at least $2.8 million, the study

[262] *Id.* at 14.
[263] *Id.*
[264] *Id.* at 15.
[265] *Id.*
[266] *Id.* at 17.
[267] *Id.* at 15.
[268] *Id.* at 15-16.
[269] *See id.* at 16.
[270] *Id.* at 17.

concludes by offering funding opportunities and describing some benefits if NTB decided to adopt the study's recommended approach.[271]

Since a majority of the 347 properties are in a Coastal Barrier Resources System,[272] federal funding would not be available for relocation efforts.[273] However, the study did suggest one innovative solution that could fully fund the property acquisitions.[274] According to 2018 Census Bureau statistics, a $0.01 increase to the property tax rate in Onslow County would generate more than $58 million in the next thirty years.[275] While the goals of such relocation efforts include increased public safety of NTB's residents, additional benefits of relocating the 347 properties include greater municipal resource input into ninety-three percent of the tax base, increasing the length of setbacks from the shoreline, habitat restoration, and improved recreation opportunities.[276] The study concluded by emphasizing that "the real benefit will be a chance to ensure the longer-term economic vitality of the more sustainable portions of the community."[277] Although NTB has not acted upon this study, this cost-benefit analysis reveals that targeted acquisitions in areas vulnerable to flooding can be a long-term, fiscally sound policy for numerous communities across the nation.

C. Urban

1. Grand Forks, North Dakota

The City of Grand Forks, North Dakota is located on the western bank of the northern flowing Red River.[278] Across the river sits its sister city, East Grand Forks, Minnesota.[279] Due to its low-lying location, Grand Forks often experiences spring flooding caused by the southern part of the river melting while the northern part remains frozen, pushing water over the banks.[280] However, during the winter of 1996-1997, the Red River Valley experienced record cold temperatures, eight blizzards, and a cumulative snowfall of over 100 inches.[281] During the week of April 13, 1997, the community prepared for a flood, placing sandbags along the dikes. While

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[271] *See id.*
[272] *Coastal Barrier Resources System*, FED. EMERGENCY MGMT. AGENCY, http://www.fema.gov/coastal-barrier-resources-system (last visited July 8, 2020) (the 1982 Coastal Barrier Resources Act (CBRA), Public Law 97-348 (96 Stat. 1653; 16 U.S.C. 3501-10), prohibits most new federal expenditures that encourage development or modification of coastal barriers).
[273] *See* W. CAROLINA UNIV., *supra* note 252, at 17.
[274] *See id.*
[275] *Id*.
[276] *See id.* at 11, 17-18 (municipal resources include "personnel time, leadership energy, emergency management effort, and money").
[277] *Id*. at 18.
[278] AMY FOTHERGILL, HEADS ABOVE WATER: GENDER, CLASS, AND FAMILY IN THE GRAND FORKS FLOOD 17 (2004).
[279] *Id.* at 17.
[280] *Id.* at 18.
[281] *See id.*; *see also* 105 CONG. REC. S3702-03 (daily ed. Apr. 25, 1997) (statement of Sen. Conrad); JAMES FRASER ET AL., CTR. FOR URBAN & REG'L STUDIES UNIV. OF N.C. AT CHAPEL HILL, IMPLEMENTING FLOODPLAIN LAND ACQUISITION PROGRAMS IN URBAN LOCALITIES 17 (Dec. 2003), *available at* https://www.researchgate.net/publication/237546980_Implementing_Floodplain_Land_Acquisition_Programs_in_Urban_Localities.

the National Weather Service had predicted that the Red River would rise to forty-nine feet,[282] the river crested at fifty-four feet–twenty-six feet above the flood stage of twenty-eight feet[283]–and water poured over the dikes.[284]

The effects of the flooding devastated Grand Forks, as well as East Grand Forks. In Grand Forks the flooding submerged or partially submerged almost 300 homes.[285] Additionally, the flooding caused an electrical short circuit leading to a fire in the historic business district.[286] However, firetrucks were unable to get to the fire because of flooded roads.[287] All told, eleven historical buildings were destroyed.[288] Seventy percent of Grand Forks' schools were also damaged.[289] "Several elementary schools, one middle school, and a high school had to be condemned and torn down."[290] In the end, the damage to Grand Forks was estimated to be $3.5 *billion*.[291] Across the river, East Grand Forks' commercial district was completely destroyed and only seven of the city's 5,501 houses escaped flood damage.[292] Despite the extensive damage, almost the entire population of the two cities, roughly 60,000 people, were safely evacuated.[293]

Following the flood, the city of Grand Forks received national sympathy, although funding to repair the damage was slower to materialize. One problem was that many of the residents of Grand Forks did not have flood insurance, either because they did not believe that they would be affected or because flood insurance agents had told them that it was unnecessary based on the National Weather Service's forecasts,[294] despite a prediction by the North Dakota Regional

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[282] FOTHERGILL, *supra* note 278, at 18; ASHLEY SHELBY, RED RIVER RISING: ANATOMY OF A FLOOD AND THE SURVIVAL OF AN AMERICAN CITY 10 (2003).
[283] SHELBY, *supra* note 282, at 10.
[284] FRASER ET AL., *supra* note 281, at 17.
[285] *Id.*
[286] *Id.*; FOTHERGILL, *supra* note 278, at 19.
[287] FOTHERGILL, *supra* note 278, at 19.
[288] *Id.*
[289] Jennifer Brooks, *Grand Forks Marks 20th Anniversary of Devastating Red River Flood*, STAR TRIB. (Apr. 8, 2017, 10:47 PM), http://www.startribune.com/grand-forks-marks-20th-anniversary-of-devastating-red-river-flood/418739053/.
[290] SHELBY, *supra* note 282, at 139.
[291] *Id.* at 149.
[292] U.S. DEP'T OF HOUS. & URBAN DEV., RECOVERY SNAPSHOT: EAST GRAND FORKS DOWNTOWN REVITALIZATION 1, https://www.hudexchange.info/onecpd/assets/File/CDBG-DR-Case-Study-East-Grand-Forks-ND-Downtown-Revitalization.pdf; Linda Tischler, *Grand Forks and East Grand Forks: After the Flood (Literally)*, FAST COMPANY (June 30, 2002), https://www.fastcompany.com/45153/grand-forks-and-east-grand-forks-after-flood-literally.
[293] FOTHERGILL, *supra* note 278, at 19 claims that this marked "the first time in American history that the entire population of a city was evacuated from its city limits." However, other sources state that only eighty-five to ninety percent of the town evacuated. *See* DAVID R. CONRAD ET AL., NAT'L WILDLIFE FED'N, HIGHER GROUND: A REPORT ON VOLUNTARY PROPERTY BUYOUTS IN THE NATION'S FLOODPLAINS, A COMMON GROUND SOLUTION SERVING PEOPLE AT RISK, TAXPAYERS AND THE ENVIRONMENT 51 (1998), https://www.nwf.org/~/media/PDFs/Water/199807_HigherGround_Report.ashx (stating that eighty-five percent of residents were forced from their homes); *1997 Grand Forks Flood By The Numbers*, FED. EMERGENCY MGMT. AGENCY (updated Nov. 22, 2019, 8:43 AM), https://www.fema.gov/1997-grand-forks-flood-numbers (stating that ninety percent of the population evacuated).
[294] FOTHERGILL, *supra* note 278, at 21; SHELBY, *supra* note 282, at 11. Both FEMA and NFIP had been issuing press releases asking people to buy flood insurance since February. *Id.* at 8.

Weather Information Center (RWIC) of a fifty-two-foot crest.[295] Turning to Washington, D.C., the mayors of Grand Forks and East Grand Forks appealed for funding.[296] On June 12, 1997, President Clinton finally signed a final appropriations bill,[297] which provided $500 million in HUD CDBG-DR funding to towns in the Upper Midwest, with $50 million to be expedited to Grand Forks.[298] Of the approximately $171 million that Grand Forks received through HUD CDBG-DR funding, the city spent ten to fifteen percent of the funds on projects in or near downtown,[299] as HUD funding had come with the condition that the city commit to building a "corporate center" to encourage reinvestment and help rebuild the city's tax base.[300] This money was also used to assist small businesses and homeowners not within the dike line, as well as those without flood insurance.[301] Grand Forks also received an additional $13 million in HMGP funding,[302] and North Dakota received a reduced cost-share rate on funding.[303]

Grand Forks used their federal funding to purchase over 800 residential and commercial properties in one of the nation's largest buyout programs.[304] The properties near the river were demolished to make way for a greenway between the levee system and the banks of the Red River and Red Lake River, which now consists of "almost [twenty] miles of paved, multipurpose trails; two golf courses; boat ramps; campgrounds; ice skating rinks; basketball and tennis courts; a softball, soccer, and football field; and more."[305]

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[295] Leon F. Osborne, Jr., *Actions and Activities of the Regional Weather Information Center during the Historic Flood of 1997*, *in* HAUNTED BY WATERS: THE FUTURE OF MEMORY AND THE RED RIVER FLOOD OF 1997 227, 229 (David Haeselin ed., 2017), https://digitalpressatund.files.wordpress.com/2017/04/haunted_by_waters_beta_2.pdf. The predicted 52-foot flood would have been a 100-year flood, however "[t]he April 1997 flood reached a river gauge of 54.11 feet or 833.11 [mean sea level] with a corresponding return interval of about *210 years*." City of Grand Forks, *Document: Floods Do Happen!*, *in* HAUNTED BY WATERS: THE FUTURE OF MEMORY AND THE RED RIVER FLOOD OF 1997 193, 195 (emphasis added). *See id.* at 194 for a map of Grand Forks' 100-year floodplain.
[296] SHELBY, *supra* note 282, at 139-40.
[297] *See id.* at 159.
[298] *Id.*
[299] *Id.* at 140; Jonathan Knutson, *Grand Forks Downtown Is 'Back All the Way*,*'* FORUM (Apr. 14, 2002), https://web.archive.org/web/20041224185906/http://www.in-forum.com/specials/flood5yrslater/article.cfm?id=8967. Notably, the funding went directly to Grand Forks rather than to the state or HUD's regional office in Denver. FRASER ET AL., *supra* note 281, at 18.
[300] SHELBY, *supra* note 282, at 209; *see also* Diane Suchman, *Grand Forks Rebuilds Its Old Downtown Creating Open Spaces and Walkways*, *in* COMMUNITY RENEWAL THROUGH MUNICIPAL INVESTMENT: A HANDBOOK FOR CITIZENS AND PUBLIC OFFICIALS 97-98 (Robert Kemp ed., 2015) (discussing Grand Forks' downtown revitalization).
[301] FRASER ET AL., *supra* note 281, at 18. "The Federal Relocation Act—part of HUD's Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970—provides financial assistance to households displaced by publicly financed projects like dikes." SHELBY, *supra* note 282, at 195.
[302] FRASER ET AL., *supra* note 281, at 18.
[303] N.D. DEP'T OF EMERGENCY SERVS. DIV. OF HOMELAND SEC., CHRONOLOGY 8, https://www.fema.gov/pdf/hazard/archive/grandforks/chronology.pdf (last visited July 10, 2020); *see also* AllPolitics, *Clinton Tours Flood-Ravaged North Dakota*, CNN (Apr. 22, 1997), https://web.archive.org/web/20090123101246/http://www.cnn.com/ALLPOLITICS/1997/04/22/earth.floods/.
[304] FRASER ET AL., *supra* note 281, at 18; U.S. DEP'T OF HOUS. & URBAN DEV., RECOVERY SNAPSHOT: GRAND FORKS RESIDENTIAL BUYOUT PROGRAM 1, https://www.hudexchange.info/onecpd/assets/File/CDBG-DR-Case-Study-Residential-Buyout-in-Grand-Forks-ND.pdf (last visited July 10, 2020) [hereinafter "GRAND FORKS RESIDENTIAL BUYOUT PROGRAM"].
[305] GRAND FORKS RESIDENTIAL BUYOUT PROGRAM, *supra* note 304, at 2.

While often cited as a successful buyout,[306] the City of Grand Forks experienced several difficulties with its buyout program. One problem was the placement of the dike line. Following the 1997 flood, the U.S. Army Corps of Engineers ("USACE") and Grand Forks faced the question of how to protect the city from future floods. While USACE initially recommended a set of clay dikes, concrete floodwalls, and an earthen wall, this proposal angered residents as it threatened to cut through downtown and two neighborhoods with houses of historical significance.[307] Facing this opposition, USACE conducted a study of an alternative solution—constructing a channel almost twenty-three miles long, which would consume 3,000 acres of farmland, negatively impact water quality, and degrade 649 acres of wetland.[308] However, this proposal was rejected by the federal government due to a price tag of $450 million.[309] Thus, the city returned to a plan of dikes and floodwalls, though the exact placement of the dike line was moved several times,[310] only to encounter another difficulty in the form of a legal challenge by some of the city's residents.

Buyout managers had preconceived notions that certain areas were going to be bought out and that this was the rational option.[311] Despite these notions, the city used local assessors to set the value of properties to help maintain the trust of citizens.[312] Yet, some citizens still chose to hold out from the buyout process, because they did not feel they were being offered a fair price for their homes or were opposed in principle to the buyout program.[313] The city's residents expressed a general sentiment of "resentment and mistrust," as they did not understand the federal rules against duplication of benefits which *deducted* from their buyout payments assistance they received from nonprofit organizations[314] or flood insurance,[315] thus resulting in smaller buyout payments. To achieve a higher payment for their properties, these residents wanted to force the city to use its power of eminent domain, thus triggering the Uniform Relocation Assistance and

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[306] FRASER ET AL., *supra* note 281, at 18.
[307] In fact, six homes in the Reeves Drive neighborhood which were threatened by the dike were eligible for the National Historic Register listing. SHELBY, *supra* note 282, at 186-87. Both Grand Forks and East Grand Forks had also previously rejected plans by USACE in the mid-1980s to build a dike and floodwall system. *Id.* at 185-86.
[308] *Id.* at 189.
[309] *Id.*
[310] FRASER ET AL., *supra* note 281, at 32.
[311] Daniel H. de Vries & James C. Fraser, *Citizenship Rights and Voluntary Decision Making in Post-Disaster U.S. Floodplain Buyout Mitigation Programs*, 30 INT'L J. MASS EMERGENCIES & DISASTERS 15 (2012), https://pdfs.semanticscholar.org/c1d5/29e2a227f1e2037342a640186f337f88cb8a.pdf (quoting a North Dakota buyout manager as saying, "I think we took the position that FEMA dollars were here to acquire these areas.").
[312] *See* FRASER ET AL., *supra* note 281, at 19; U.S. Dep't of Hous. & Urban Development, *Preparing for the Next Disaster: Three Models of Building Resilient Communities*, EVIDENCE MATTERS 19, 23 (2015), https://www.huduser.gov/portal/periodicals/em/EM_Newsletter_winter_2015.pdf.
[313] *See* FRASER ET AL., *supra* note 281, at 39 (stating that residents felt forced into participating in the buyout); SHELBY, *supra* note 282, at 196.
[314] Following the flooding in Grand Forks, "many nonprofit entities, charitable organizations, church groups, and others" provided assistance, such as "cash, volunteer labor, and donated materials for repair and rebuilding." C. Emdad Haque & Robert W. Tait, *Institutional Assistance for Flood-Disaster Recovery and Its Impact on Resilience in the Red River Basin*, *in* PRAIRIE PERSPECTIVES: GEOGRAPHICAL ESSAYS 87, 99 (Douglas C. Munski ed., 2001), https://www.yumpu.com/en/document/read/32237098/prairie-perspectives-pcag-university-of-winnipeg. However, government agencies, private entities, and nonprofits tried to coordinate to help people while avoiding duplication of benefits. *Id.* For example, organizations tried to avoid providing free building materials to homeowners who had already received an insurance claim to cover the damage. *Id.*
[315] FRASER ET AL., *supra* note 281, at 39-40; *see also Duplication of Benefits*, FED. EMERGENCY MGMT. AGENCY, https://www.fema.gov/hmgp-appeal-keywords/9126 (last visited July 10, 2020).

Real Property Acquisition Policy Act of 1970 (URA).[316] Under the Federal Relocation Act of the URA, HUD must provide homeowners who are displaced for public projects with "comparable and suitable" replacement homes or pay the difference for a replacement home.[317] Upon learning of the Federal Relocation Act, one resident declared, "I'm sitting on it. Until they put the last piece of dike in, I'm Eminent Domain, I'm Federal Relocation Act."[318] Eventually Grand Forks did turn to eminent domain to force residents in the dike placement line to move.[319] Several citizens then filed suit against both Grand Forks and FEMA, "claiming city officials were 'bullying residents into selling their homes for unfair prices.'"[320] This lawsuit was dismissed in Fargo District Court.[321] However, this did not put an end to the residents' feelings that they were taken advantage of during the buyout process.[322]

Another difficulty the city faced in conducting buyouts was obtaining documentation of clear title. As both city hall and the county register of deeds office were devastated by the flooding, the city had to look to a private company that did title work for the city.[323] Because of this lesson, the city now uses a computerized system to store title documents and does not keep such documents on the first floor or in the basements of buildings.[324] This lesson was only one of many regarding vital infrastructure and building codes that the city took away from this experience.

As citizens were without potable water for twenty-three days following the flood, the city also relocated the water treatment plant's electrical transformers and panels above the 1997 flood level, moved air compressors and records to upper floors of the plant, and built metal flood shields for doors and windows.[325] The city also purchased land to the west of town to build a new water treatment plant in the future,[326] built a new elementary school "above the base-flood elevation" and implemented new building codes before allowing buildings in the downtown area to rebuild and reopen.[327] Although "[u]nder enormous pressure to make exceptions to local floodplain ordinances, city officials instead held firm and enforced local regulations that required building back with special measures to reduce future losses."[328]

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[316] Lana F. Rakow, *Why Did the Scholar Cross the Road? Community Action Research and the Citizen-Scholar*, *in* COMMUNICATION IMPACT: DESIGNING RESEARCH THAT MATTERS 5, 11 (Susanna Hornig Priest ed., 2005).
[317] SHELBY, *supra* note 282, at 195.
[318] *Id.* at 196; *see also* Rakow, *supra* note 316, at 11.
[319] de Vries & Fraser, *supra* note 311, at 18.
[320] SHELBY, *supra* note 282, at 196; *see also* Gordon Russell, *Homeowner Rocked Boat in Defying Buyout*, TIMES-PICAYUNE (Dec. 12, 2005, 3:32 AM), https://www.nola.com/news/environment/article_aea061db-1f90-5684-9a58-fb32bf3badbf.html.
[321] de Vries & Fraser, *supra* note 311, at 18.
[322] FRASER ET AL., *supra* note 281, at 40 (one Grand Forks resident proclaimed "[t]hey stole $53,000 from me and I will be bitter for the rest of my life. The city lied continually and this was proven in Federal District Court. There was a big lack of communication.").
[323] *Id.* at 33.
[324] *Id.*
[325] MITIGATION CTR., EARTHQUAKE ENG'G RESEARCH INST., SURVIVING & BUILDING BETTER: THE NEW GRAND FORKS, NORTH DAKOTA 4, http://mitigation.eeri.org/files/resources-for-success/00041.pdf.
[326] *Id.*
[327] Michala Prigge, *A Conversation with Ken Vein: I'm Glad That You Don't Associate Grand Forks with the Flood!*, *in* HAUNTED BY WATERS, *supra* note 295, at 63, 64; MITIGATION CTR., *supra* note 325, at 4.
[328] MITIGATION CTR., *supra* note 325, at 3.

In addition to buying out flooded property, the city needed to replace the lost low-and moderate-income housing. Thus, the city contracted with a private, non-profit organization with experience in low-and moderate-income housing for seniors and disabled individuals, Grand Forks Homes.[329] The city funded the project using CGBG funds and $7.75 million from Fannie Mae's Housing Impact Fund.[330] Grand Forks Homes built 180 homes on the undeveloped west edge of the city.[331] These homes were priced from $105,000 to $147,000 despite being intended to replace homes valued at $50,000 to $80,000.[332] The location was also perceived as a negative.[333] Thus, the city only sold twelve homes by February 1999.[334] Grand Forks eventually lowered the prices by an average of $17,500 and the properties sold,[335] though displaced residents still had "to bridge the gap" between what they were paid for their old homes and the cost of these new houses.[336]

After Hurricane Floyd hit North Carolina in 1999, the former mayors of Grand Forks and East Grand Forks urged North Carolina communities to see the buyouts as "an opportunity for recovery and continued growth."[337] Despite its challenges, Grand Forks itself did manage to survive and rebuild following the flood of 1997. As of 2018, Grand Forks' population had grown to 70,770,[338] and "Grand Forks city officials say the downtown is stronger than it was before the flood with more small businesses, shops and entertainment options."[339] While the jobs market in Grand Forks has remained relatively flat over the last two decades, in contrast to neighboring cities that continue to grow, it is working to continue to develop downtown and to retain more young

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[329] GRAND FORKS RESIDENTIAL BUYOUT PROGRAM, *supra* note 304, at 1-2; SHELBY, *supra* note 282, at 198.
[330] SHELBY, *supra* note 282, at 198; TERRY SHOPTAUGH, INTERVIEW WITH JOEL MANSKE 28 (June 19, 1998), https://media.mnhs.org/things/cms/10195/751/AV1999_66_19_M.pdf. Fannie Mae's Housing Impact Fund was created in 1991 to provide short-term loans for development of single-family and multifamily affordable housing, including funding for rehabilitation of older low-income rental housing developments and other affordable housing investments. While this program no longer appears to exist, Fannie Mae has recently established a new fund focused on low-income housing tax credits for properties in areas that experience major disasters or emergencies. *Fannie Mae Announces $50 Million Investment in Low-Income Housing Tax Credit Fund*, FANNIE MAE (March 5, 2020), https://www.fanniemae.com/portal/media/corporate-news/2020/mf-lihtc-fund-closing-6991.html. Grand Forks intended to pay off the borrowed money using the proceeds from the sale of the homes. SHELBY, *supra* note 282, at 198.
[331] GRAND FORKS RESIDENTIAL BUYOUT PROGRAM, *supra* note 304, at 1.
[332] *Id.*; SHELBY, *supra* note 282, at 198-99.
[333] One Grand Forks resident explained that "[n]o one wanted to live in those houses they built out there. They were too far away from town--from work, from school, from shopping, everything. Plus, there were no trees and the prices were way too high. The city had a heck of a time getting flooded folks to buy those units." FRASER ET AL., *supra* note 281, at 27; *see also The Congressional Subdivisions*, DRAVES.COM (updated May 1999), http://www.draves.com/gf/gfcong.htm (discussing why the houses did not sell).
[334] GRAND FORKS RESIDENTIAL BUYOUT PROGRAM, *supra* note 304, at 1.
[335] *Id.* at 2; SHELBY, *supra* note 282, at 199.
[336] Gordon Russell, *Worst Flood until Katrina Was Grand Forks, North Dakota*, TIMES-PICAYUNE (Dec. 12, 2005, 3:19 AM), https://www.nola.com/news/environment/article_fb853084-f325-593e-b8ed-e16cd98ee220.html.
[337] FRASER ET AL., *supra* note 281, at 19-20.
[338] Tess Williams, *Population Increases in Grand Forks County*, GRAND FORKS HERALD (Apr. 19, 2019, 4:00 PM), https://www.grandforksherald.com/news/4601708-population-increases-grand-forks-county.
[339] Dan Gunderson, *20 Years after Epic Flood, Red River Towns No Longer Dread the Spring*, MPR NEWS (Apr. 17, 2017, 9:00 AM), https://www.mprnews.org/story/2017/04/17/red-river-flood-20-year-anniversary-towns-transformed; *see also* Ted Gregory, *Grand Forks Cresting after Flood of 1997*, CHI. TRIB. (Apr. 22, 2007), https://www.chicagotribune.com/news/ct-xpm-2007-04-22-0704220035-story.html.

people.[340] The river continues to be part of the area's story, with the neighboring cities of Fargo, North Dakota and Moorhead, Minnesota still worrying about flooding and a $2 billion diversion planned to channel water around Fargo,[341] a project which has been challenged by Minnesota due to the impact on the state.[342]

Grand Forks' unique story also provides valuable insight into the importance of public participation, or at least the public's perception of public participation, following a disaster. A study conducted by researchers at the University of North Dakota almost five years after the Red River Flood interviewed citizens in both Grand Forks and East Grand Forks "to determine the impact of participation both on the citizens' evaluation of government actions and on their general trust of city government in the aftermath of a disaster."[343] The study found that, following the flood, Grand Forks employed three forms of citizen involvement: (1) more frequent city council meetings and meetings explicitly to discuss flood control measures, (2) the establishment of a public information office, and (3) the establishment of the Mayor's Task Force on Business Redevelopment.[344] However, because citizens were not always able to speak at these meetings and the Task Force was composed solely of business leaders, some citizens in Grand Forks may have believed they had less opportunity to influence decisions and that the city had attempted to involve citizens less than in East Grand Forks, which held a series of meetings expressly to involve citizens.[345] Yet, this study found "citizen's perceptions of participation opportunities" more likely to lead to higher trust than actual participation.[346]

Several lessons can be drawn from Grand Forks' experiences: the importance of communicating with citizens regarding information like flood insurance, funding opportunities and associated rules; the necessity sometimes to lose part of an historic neighborhood or relocate neighborhoods, including LMI neighborhoods, in order to save a city; the importance of localities protecting crucial records and infrastructure, such as water treatment plants; and how essential it is to ensure that citizens are involved in the decision-making process following a disaster.

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[340] Sam Easter, *Grand Forks 'Running to Stand Still' in Jobs and Labor Force, Economist Says*, GRAND FORKS HERALD (Dec. 8, 2019, 11:00 AM), https://www.grandforksherald.com/business/4810065-Grand-Forks-running-to-stand-still-in-jobs-market-and-labor-force-economist-says.

[341] Dan Gunderson, *Upstream Landowners See Hope in Minnesota Diversion Delay*, WIS. ST. FARMER (July 13, 2019, 4:41 PM), https://www.wisfarmer.com/story/news/midwest/2019/07/13/upstream-landowners-see-hope-minnesota-diversion-delay/1725538001/.

[342] Dan Gunderson & Brian Bakst, *Minnesota Joins Lawsuit to Stop Red River Flood Diversion Project*, MPR NEWS (Dec. 29, 2016, 5:22 PM), https://www.mprnews.org/story/2016/12/29/minnesota-joins-lawsuit-to-stop-red-river-flood-diversion-project; Gunderson, *supra* note 339; *see also* Michael Pates, *Taking on Water: Red River Flood Protection Forcing Some Farmers to Relocate*, JAMESTOWN SUN (Feb. 5, 2020, 6:00 AM), https://www.jamestownsun.com/business/agriculture/4916534-Taking-on-water-Red-River-flood-protection-forcing-some-farmers-to-relocate.

[343] Mary Grisez Kweit & Robert W. Kweit, *Participation, Perception of Participation, and Citizen Support*, 35 AM. POL. RES. 407, 409-10 (2007).

[344] *Id.* at 419-20.

[345] *Id.*

[346] *Id.* at 421.

2. Davenport, Iowa

Davenport is a city with a population of 100,000 on the Mississippi River that has long lived with flooding without permanent flood control barriers, such as a flood wall.[347] Rather, the city erects temporary barriers when the river rises due to melting snow and spring rains.[348] As Davenport's mayor explained, the city "didn't put up a flood wall and push our problems down to places like Louisiana": rather, the city acknowledged that "[t]he river does come outside of its banks. We know that. We embrace that."[349]

Like much of the Midwest, Davenport experienced massive flooding in the winter of 1993 with the river reaching what was then a record level at 22.63 feet.[350] Although the river flooded 50-100 businesses and over 300 residential units,[351] Davenport's drinking water utilities were not impacted because the facilities were built above the 500-year floodplain.[352]

Davenport had previously rejected a $34 million plan by the USACE to build a floodwall in the 1980s and following the 1993 flooding decided once again not to erect permanent flood control barriers.[353] Rather, the city's major floodplain management strategy was to buy properties in the floodplain.[354] In fact, the city had budgeted for acquisitions since 1990 and had funded these acquisitions with a special sales tax.[355] Following the 1993 flood, Davenport attempted to purchase property along the Mississippi River. However, due to a lack of interest, the city instead purchased

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[347] Scott McFetridge and Margery A. Beck, *Still Recovering from Summer Floods, Davenport Reconsiders a Flood Wall It Has Long Rejected*, DES MOINES REG. (July 28, 2019, 5:21 PM), https://www.desmoinesregister.com/story/weather/2019/07/28/iowa-flooding-davenport-reconsiders-flood-wall-has-long-rejected/1853063001/.

[348] Bill Lukitsch, *Davenport Mayor Frank Klipsch Announces Details, Members, of Flood Task Force, Sets First Meeting*, QUAD CITY TIMES (July 5, 2019), https://qctimes.com/news/local/govt-and-politics/davenport-mayor-frank-klipsch-announces-details-members-of-flood-task/article_a865619c-ad26-5211-95a9-7185dd75d4b8.html.

[349] Tristan Baurick, *For Some Mississippi River Cities, There Are Only 2 Choices — Adapt or Move: The River's Revenge*, TIMES-PICAYUNE (updated June 1, 2020, 4:32 PM), https://www.nola.com/news/environment/article_f6c788e5-fc7b-5289-bc01-8e66034b3d7a.html.

[350] Ian Livingston, *Davenport, Iowa, Endures Major Flooding as the Mississippi River Reaches Record Levels Near the City*, WASH. POST (May 3, 2019), https://www.washingtonpost.com/weather/2019/05/03/davenport-iowa-is-flooding-mississippi-river-reaches-record-levels-nearby/. For a discussion of the 1993 flooding see generally U.S. DEP'T OF HOMELAND SEC. & FED. EMERGENCY MGMT. AGENCY, *supra* note 42. Davenport's 1993 record was recently broken in May 2019. Shelby Fleig, *Mississippi River Floodwaters at Historic Level – and Rising – in Davenport, Iowa*, DES MOINES REG. (updated May 3, 2019, 10:54 AM), https://www.usatoday.com/story/news/nation/2019/05/02/davenport-flooding-iowa-mississippi-river-record/3657709002/.

[351] Katherine Anderson, *Lessons from the Mississippi Flood*, 59 J. PROP. MGMT., 41, 43 (1994).

[352] Joe Reid, *Overcoming the Flood: How Midwestern Utilities Managed Disaster*, 86 J. AM. WATER WORKS ASS'N 58, 63 (1994).

[353] BOB FREITAG ET AL., FLOODPLAIN MANAGEMENT: A NEW APPROACH FOR A NEW ERA 133-34 (2009); Kim Norvell, *Davenport Is the Largest City Along the Mississippi River in Iowa Without a Permanent Floodwall*, DES MOINES REG. (updated May 2, 2019, 10:05 AM), https://www.desmoinesregister.com/story/news/2019/05/01/davenport-flooding-largest-iowa-city-without-mississippi-river-floodwall-heres-why-riverfront/3639576002/.

[354] FREITAG ET AL., *supra* note 353, at 134.

[355] CHARLES C. BOHL ET AL., NATURAL HAZARD MITIGATION: RECASTING DISASTER POLICY AND PLANNING 207 (1999).

properties in the Garden Addition, located on the city's southwest side and separated by an earthen dam from Blackhawk Creek,[356] where the city's limited funds could be more efficiently applied due to the lower housing prices.[357] All told, the city has purchased eighty-eight homes in the Garden Addition using local and federal funds, making up three quarters of the city's buyouts since 1991.[358] Yet the city did not, like Grand Forks, build new housing for people displaced by the buyout, and residents complained that the amounts they were offered for their homes were not enough to afford "decent housing elsewhere in the city."[359]

Furthermore, any new development, remodels, or major repairs in Davenport's floodplain require a floodplain development permit.[360] In addition to restricting development in the floodplain, Davenport allows parts of the downtown to function as an urban floodplain with buildings adapted to flooding.[361] This urban floodplain consists of 560 acres of parks and trails, a marsh, and a baseball stadium protected only by an 800-foot long removable floodwall.[362] Davenport also participates in the NFIP, which requires that the city meet certain floodplain management standards in exchange for federally backed flood insurance for the city's property owners, and the Community Rating System (CRS), which allows property owners to receive a discount on their flood insurance premiums because the city has undertaken certain activities that exceed the NFIP requirements.[363]

Despite Davenport's commitment to living with the water, the city has continued to experience increased flooding over time. Extensive flooding in 2001 required a $3 million cleanup, for which Davenport paid $310,000 and FEMA paid the remaining ninety percent. [364] Notably, $300,000 is the estimated cost per year for Davenport to maintain a levee. [365] Thus, some argued that Davenport should not receive such federal funding because the city had repeatedly refused to

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[356] Ed Tibbetts, *Still Standing: Davenport's Garden Addition*, QUAD-CITY TIMES (July 6, 2018), https://qctimes.com/news/local/still-standing-davenport-s-garden-addition/article_ffd75e0e-da7b-5cad-ac08-aeff8685132f.html.
[357] BOHL ET AL., *supra* note 355, at 208.
[358] Tibbetts, *supra* note 356; *see also* Barb Ickes, *Flood of '93: How It Changed the Quad-Cities*, QUAD-CITY TIMES (July 6, 2018), https://qctimes.com/news/local/flood-of-how-it-changed-the-quad-cities/article_f07f2394-8c7d-5bf1-8f80-53397e13e7ec.html.
[359] Tibbetts, *supra* note 356.
[360] *Floodplain Development*, CITY DAVENPORT (last visited July 11, 2020), https://cityofdavenportiowa.com/our_community/building_land_development/what_requires_a_permit__/floodplain_development. The Iowa Department of Natural Resources can delegate authority to cities to issue permits in SFHA areas. Amit Mahadevia et al., *Floodplain Management Regulations, Building Codes, and Standards*, *in* MITIGATION ASSESSMENT TEAM REPORT: MIDWEST FLOODS OF 2008 IN IOWA AND WISCONSIN: BUILDING PERFORMANCE OBSERVATIONS, RECOMMENDATIONS, AND TECHNICAL GUIDANCE 2-1, 2-2 (2009), https://www.fema.gov/media-library-data/20130726-1722-25045-0903/fema_p_765.pdf; *see also* STUART HUNTINGTON, COUNTY ZONING IN IOWA: AN EXPLANATION OF CHAPTER 335 OF THE IOWA CODE 2 (2000), https://lib.dr.iastate.edu/cgi/viewcontent.cgi?article=1012&context=extension_communities_pubs.
[361] Baurick, *supra* note 349.
[362] *Id.*; Norvell, *supra* note 353.
[363] *Flood Insurance*, CITY DAVENPORT (last visited July 11, 2020), https://cityofdavenportiowa.com/cms/one.aspx?portalId=6481456&pageId=16477994.
[364] Baurick, *supra* note 349.
[365] *Id.*

invest in a permanent barrier.[366] However, by 2002 a levee no longer made economic sense as the city had already moved so many assets out of the floodplain.[367]

The flooding event in 2019, which reached a record high of 22.7 feet in a region where the flood stage is fifteen feet,[368] prompted Davenport to once again consider building a permanent flood wall.[369] Davenport has established a task force to consider this option.[370] The estimated cost of such a wall is $175 million, which would be mostly locally funded.[371] The city is also facing new infrastructure issues. In March of 2019, the freight company Canadian Pacific Railway decided to raise its railway tracks along the river due to increased flooding, making many of the city's railroad and street intersections impassable.[372] For now, Davenport is working to evaluate its options, with the city, USACE, and Iowa Department of Natural Resources conducting a flood response and recovery planning survey to present to the task force and the city planning to engage an engineering firm to look into long-term options.[373]

While Davenport is facing challenges of a continuously flooding Mississippi River, many of the actions that the city has taken provide valuable lessons. First, in contrast to the current fight between Minnesota and Grand Fork's neighbor Fargo, North Dakota, the City of Davenport has not pushed its problem onto other localities. Rather, the city has attempted to find ways to live with and embrace the water. This is most notable in the city's restriction of floodplain development and its use of parts of downtown as an urban floodplain. Yet the city is now having to reconsider this plan, emphasizing that localities must account for more severe weather conditions over time. Second, the city took a long-term approach to buyouts and began budgeting for buyouts years before engaging in the process. However, the city's initial attempt to buy property along the river highlights that in some cases residents are not willing to sell. Further, the fact that Davenport then resorted to buyouts in a lower-income neighborhood raises social justice concerns, as these residents could not then afford to locate to other neighborhoods in the city.

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[366] FREITAG ET AL., *supra* note 353, at 134.
[367] *Id.*
[368] *Mississippi River at Rock Island*, NAT'L WEATHER SERV., ADVANCED HYDROLOGIC PREDICATION SERV., https://water.weather.gov/ahps2/hydrograph.php?wfo=dvn&gage=rcki2 (last updated Mar. 1, 2019).
[369] Brad Ward, *Latest: Davenport Warns the Garden Addition Dike May Break; Plus the Latest Quad-City Flooding Developments*, QUAD-CITY TIMES (May 1, 2019), https://qctimes.com/news/local/latest-davenport-warns-the-garden-addition-dike-may-break-plus/article_12d72134-6ec5-5e81-8574-65fcf9e3e547.html.
[370] Lukitsch, *supra* note 348.
[371] *Id.*; WQAD Digital Team, *Davenport Ponders a Wall It Has Long Rejected*, WQAD8 (updated July 29, 2019, 10:12 AM), https://www.wqad.com/article/news/local/drone/8-in-the-air/davenport-ponders-a-wall-it-has-long-rejected/526-5dbdbcc3-7489-41ed-959e-deea7e5cee54.
[372] Bill Lukitsch, *Along with Its Tracks, Canadian Pacific Raises Tensions in City Hall*, QUAD-CITY TIMES (Apr. 6, 2019), https://qctimes.com/news/local/govt-and-politics/along-with-its-tracks-canadian-pacific-raises-tensions-in-city/article_d9146f09-8828-59e7-a27e-907734d57b3d.html.
[373] Alma Gaul, *Davenport's 2020 Flood Plan Calls for Beefed Up Barriers*, QUAD-CITY TIMES (Feb. 7, 2020), https://qctimes.com/news/local/davenport-s-flood-plan-calls-for-beefed-up-barriers/article_dfa71685-c648-55a2-82c7-7d693f0c89ba.html.

IV. BEST PRACTICES FOR MANAGED RETREAT

From the English coast to the shores of the Mississippi River, the impacts of flooding are continuing to increase dramatically, and some places are becoming unlivable. These initial examples of managed retreat provide valuable lessons on how to successfully navigate the process of dealing with rising waters. These best practices can be categorized into three general lessons: thinking long-term, communicating with members of the community, and utilizing dynamic funding options.

A. Thinking Long-Term

Multiple studies have found that programs of managed retreat, including buyouts, can be more fiscally sustainable in the long term than "holding the line." This reasoning was the impetus for the UK's Environmental Agency to abandon the defenses at Medmerry in favor of managed realignment and was shown to be the most financially responsible plan for North Topsail Beach by Western Carolina University.[374] Funding instead could be invested into a relocation program or used to protect the shoreline through projects that reduce erosion.[375] Although this approach may not be suitable for every community across the nation, it presents a unique opportunity for localities to preserve their budgets and shorelines.[376]

Although buyouts of suburban beachfront areas can be cost efficient over time, once localities decide to encourage managed retreat, they must also take into account potentially conflicting legislative and judicial interests, as experienced with the Riggings Home Owner Association.[377]

Another issue for implementation of a managed retreat program is the question of which neighborhoods are to be bought out. Grand Forks shows both the opposition that cities may face from wealthy, historic neighborhoods as well as the problems of ensuring that LMI neighborhoods are replaced with nearby, affordable housing with amenities.[378] Meanwhile, Davenport's buyout process also raises questions of social justice. The city chose to stretch its money further by buying out at-risk properties in an LMI neighborhood but did not help residents relocate. Together, these Midwestern cities showcase the line localities must walk between buying out vulnerable neighborhoods while not disenfranchising lower-income residents. Coastal Virginia cities are already beginning to recognize the importance of ensuring sustainable neighborhoods for LMI individuals, such as Norfolk, Virginia's efforts to revitalize the St. Paul's area, which has the city's highest concentration of public housing.[379] Similarly, the City of Newport News obtained a grant

[374] *Supra* sections III.A.3.; III.B.2 and notes (the proposed buyout at NTB could save the city at least $2.8 million over thirty years).
[375] *See, e.g.*, the Habitat Restoration Project discussed *supra* section III.B.1 and notes.
[376] *Id*.
[377] *Supra* III.B.1 and notes.
[378] *See supra* part III.C.1 and accompanying notes.
[379] *Office of St. Paul's Transformation*, CITY NORFOLK, https://norfolk.gov/4879/Office-of-St-Pauls-Transformation, (last visited July 13, 2020).

from HUD's Choice Neighborhoods Initiative to increase resiliency in the city's historically African-American Marshall-Ridley neighborhood.[380]

Such conflicts are also present not only within cities, but across cities. In the UK, like elsewhere, the government has funded realignment schemes for easily displaced farmland that provided defensive structures for wealthy cities.[381] On the other hand, while governments sometimes buy out riparian properties, other times they are left to the water. A study published in Science Advances found that when the US government decides to purchase properties, wealthy counties get more FEMA buyout funding than poorer communities.[382] This disparity is in part because smaller and tribal communities often lack the resources or recognition to advocate for themselves. Debates or lack of expertise at the local level can also prevent a locality from successfully obtaining funding or grants. Newtok struggled for decades to get funding for relocation, losing millions due to a lack of administrative expertise. Additionally, buyouts and relocations, even when desired by the community, can take a very long time; Newtok spent over twenty-five years working to obtain funding to move less than a quarter of the village.[383] Cities attempting to engage in buyouts or otherwise encourage relocation may also experience holdouts among property owners, such as in Grand Forks or with the Riggings HOA.[384]

Lastly, implementing a program for managed retreat must take into account the fact that weather events will continue to be more extreme. Estimates for sea-level rise in Virginia may vary but studies are showing that this increase will happen exponentially, increasing over time.[385] This reality has posed a problem for the City of Davenport, which is now being forced to reconsider how to move forward, and highlights the importance of preserving crucial infrastructure. Following the flood in Grand Forks, the city lost vital property records when downtown government buildings flooded, and residents went twenty-three days without potable water. In contrast, Davenport's water treatment plant, which was located above the 500-year floodplain, was not impacted by flooding. Yet cities can still obtain some value from flood-prone properties without risking vital infrastructure. The City of Norfolk has imposed a system of "resilience points," which would allow parcels threatened by sea level rise to remain undeveloped. Developers would purchase or obtain perpetual conservation easements on low-lying properties in order to earn points to build on higher ground.[386] Another solution embraced by both Grand Forks and Davenport is to use low-lying areas as urban floodplains that also provide the community with valuable parks and trails. Likewise, the City of Virginia Beach, Virginia has considered a program

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[380] *Newport News Marshall-Ridley Choice Neighborhood*, MARSHALL-RIDLEY, http://www.newportnewschoice.com/#home (last visited July 13, 2020).
[381] *See supra* part III.A.2 and accompanying notes.
[382] Mach et al., *supra* note 39, at 5.
[383] *See supra* part III.A.1 and accompanying notes.
[384] *See supra* part III.B.1.
[385] *See* VA. INST. MARINE SCI., *supra* note 9 (explaining that "[t]he quadratic trend, shown in darker orange, indicates that sea level is not only rising at this tidal station, but that the rate of sea-level rise is accelerating with time.").
[386] Jim Morrison, *Climate Change Turns the Tide on Waterfront Living*, WASH. POST (April 13, 2020), https://www.washingtonpost.com/magazine/2020/04/13/after-decades-waterfront-living-climate-change-is-forcing-communities-plan-their-retreat-coasts/?arc404=true.

to buy out at-risk properties, demolish the buildings, and restrict future development, leaving the area for a park or flood control project.[387]

In recognition of the need for long-term planning, the EU Floods Directive requires localities to design short-term (0 to 20 years), medium term (20 to 50 years), and long term (50 to 100 years) plans.[388] Similarly, localities in coastal Virginia are required to have a comprehensive plan, including strategies to address SLR if they are within the Hampton Roads Planning District Commission.[389] Longer term planning, such as Norfolk's Vision 2100,[390] could be a valuable tool for localities to engage with citizens and ensure a fair buyout process that retains the unique character of the community and a safe place for all residents.

B. Communicating with Members of the Community

The first issue for implementation of managed retreat programs is the phrase "managed retreat" itself, which often bears a negative connotation as it is perceived as giving up land rather than fighting to protect vulnerable areas. Partially because of the negative connotation, the UK refers to the practice of moving away from areas vulnerable to rising waters and allowing water to inundate them as "managed realignment." The mayors of Grand Forks and East Grand Forks have depicted managed retreat as an opportunity for growth and recovery. Similarly, the City of Norfolk, Virginia has also avoided the use of the phrase which it considers to be "politically explosive."[391] Furthermore, the Norfolk Vision 2100 plan declines to evaluate managed retreat, only mentioning the word "retreat" once, and plans instead to address each property's needs.[392] Instead of suggesting plans to relocate LMI communities that will inevitably be left to drown in eighty years without government intervention, this "vision" depicts Norfolk's twenty-second century war with the rising seas as "an opportunity[.]"[393]

Even without explosive language, managed retreat programs will struggle to succeed if citizens of a community feel that they are not engaged in the process. As noted earlier, the City of Grand Forks has struggled to make citizens feel they had an opportunity to participate in the community planning process. However, the buyout in Medmerry, UK was successful, because managers spent several years building community trust and engaging the community on multiple levels. Thus, Medmerry provides several lessons for communication. First, the success of a project

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[387] Peter Coutu, *Virginia Beach Considers a Program to Buy Out or Elevate Homes in Danger of Flooding*, VA. PILOT (Jan. 8, 2020, 2:00 PM), https://www.pilotonline.com/news/environment/vp-nw-virginia-beach-buyout-flood-20200108-gopea7cb3reidcvr7h62ywfmz4-story.html; Peter Coutu, *Virginia Beach Eyes Expansive Program to Buy Out Frequently Flooded Homes. Charlotte Could Be a Model*, VA. PILOT (Aug. 31, 2019, 11:00 AM), https://www.pilotonline.com/news/environment/vp-nw-flooding-buying-homes-20190830-am43fv5zs5er7b62fuzr4gzgse-story.html.

[388] Env't Agency, *Shoreline Management Plans (SMPs)*, GOV.UK (March 11, 2009), https://www.gov.uk/government/publications/shoreline-management-plans-smps (last updated March 7, 2019).

[389] *Comprehensive Plan*, WETLANDS WATCH, http://wetlandswatch.org/comprehensive-plan (last visited July 13, 2020).

[390] *See generally* CITY OF NORFOLK, NORFOLK VISION 2100 3 (2016), https://www.norfolk.gov/DocumentCenter/View/27768/Vision-2100---FINAL?bidId=.

[391] Morrison, *supra* note 386.

[392] *See* CITY OF NORFOLK, *supra* note 390.

[393] *Id.* at 3.

can depend on close collaboration with affected stakeholders. Similarly, early and frequent engagement with local residents is critical. Finally, the formation of specialist groups to manage issues was very important for addressing stakeholder concerns,[394] and the Pathfinder Project demonstrated that getting participants to engage is a consistent problem throughout diverse projects and communities;[395] so localities should be sure to engage in tailored outreach. For example, Rochdale published information in several languages and reached out to religious leaders in the community.

While the oft-used term "community engagement" is easy to invoke, actually achieving it is no small feat – proactively reaching out to communities in ways that encourage involvement and *actually* allow representative engagement is a recurring, challenging issue that will take time, effort, and hard work on the part of planners. Low income and at-risk communities often do not want to be involved with government actors or projects, unfulfilled government promises can set unrealistic expectations and leave people in harm's way years later, and at-risk home owners might purposefully ignore or misconstrue hazards.[396] Yet proactively engaging with the community, as in Medmerry, can result in successful relocation programs.

C. Utilizing Dynamic Funding Options

Federal funding can provide an important source of money for localities to conduct buyouts in flood prone areas, as illustrated by the buyout programs in both Grand Forks and Davenport.[397] Yet localities or states must also bear a portion of the costs associated with buyouts,[398] and even in communities that receive federal funding there is unlikely to be enough money.[399] Smaller impoverished communities, such as Newtok, Alaska are less likely to receive federal funding than communities such as Grand Forks, where flooding made national headlines.

Localities can be creative in seeking funding, however. The village of Newtok has relied on novel funding mechanisms to help secure money for its community. Although Newtok is an indigenous community, non-indigenous localities can also appeal to the federal government. The cities of Grand Forks and East Grand Forks secured their federal funding in part through the efforts of their mayors lobbying Congress.

Both Gloucester County, Virginia and New Jersey worked closely with the federal government to receive FEMA HMGP funding to support their acquisition programs. Gloucester County achieved initial success in its buyout program, purchasing roughly fifty-nine properties and then converting that land into conservation areas.[400] The New Jersey Department of Environmental Protection's Blue Acres Buyout Program achieved even greater success through strong federal partnerships and vigorous efforts to relocate low income communities.[401]

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[394] *See supra* part III.A.3 and accompanying notes.
[395] *See supra* part III.A.4 and accompanying notes.
[396] *See supra* part III.A.1 and accompanying notes.
[397] *See supra* part III.C and accompanying notes.
[398] *See supra* part II.B.1 and accompanying notes discussing federal funding.
[399] *See supra* part III.A.1 and accompanying notes.
[400] *See Adaptation Stories: Managed Retreat*, *supra* note 116.
[401] *See* N.J. DEP'T OF CONSUMER AFFAIRS, *supra* note 127, at 2-6.

While these early cases were successful in obtaining some federal funding, as the impacts of climate change increase and flooding becomes more common, the availability of special funding through political channels may become less available. Some have noted that "[t]he amount of recovery money delivered to [Grand Forks] exceeded expectations because there were few other disasters or wars during that time."[402] This will not always be the case. In fact, media focus on one disaster can concentrate funding and drown out other areas of need.[403] There will never be enough money to protect everyone. The earlier localities act, however, the better chance they will have to obtain limited federal funding.

V. CONCLUSION

From rural Alaska to coastal North Carolina to urban cities in the Midwest, we can draw lessons to help ensure that coastal Virginia continues to thrive in the face of sea level rise. These lessons include communicating with affected communities, planning for the long-term with a recognition that environmental conditions will continue to change, and seeking dynamic funding options. While these case studies may provide insight for beginning the process of managed retreat, coastal Virginia presents its own challenges as the region is already facing frequent inundation that disproportionately impacts LMI communities. Within the next several decades, certain LMI communities in coastal Virginia are predicted to become uninhabitable due to flooding, but it is not too late for localities to act now to move in a new direction.

[402] Prigge, *supra* note 327, at 66.
[403] Brown, *supra* note 218, at 207.