Spring 2018

Recurrent Flooding, Sea Level Rise, and the Relocation of At-Risk Communities: Case Studies from the Commonwealth of Virginia

Jeffrey Moore

Lauren Acker

Recurrent Flooding, Sea Level Rise, and the Relocation of At-Risk Communities:
Case Studies from the Commonwealth of Virginia


Photo Courtesy of Gloucester County Department of Planning and Zoning

Jeffrey Moore, J.D. Candidate 2018
Virginia Coastal Policy Center
William & Mary Law School

Lauren Acker, J.D. Candidate 2019
Virginia Coastal Policy Center
William & Mary Law School

Spring 2018

About the Authors

Jeffrey Moore is a third year student at William & Mary Law School. He joined the Virginia Coastal Policy Center in the fall of 2017. At William & Mary, he serves as the Executive Editor of the Environmental Law & Policy Review, and interned with the Denver City Attorney's Office and the Future of Privacy Forum. He graduated from Colorado College in 2013 where he studied History and Museum Studies.

Lauren Acker is a J.D. Candidate 2019 at William and Mary Law School. Lauren graduated *magna cum laude* with a BA in Sociology and Anthropology from Washington and Lee University in 2012. Upon graduation, she moved to Oregon where she lived, worked, and played in the Pacific Northwest before returning to Virginia to attend law school. She interned in Phnom Penh, Cambodia her 1L summer through the Center for Comparative Legal Studies and Post-Conflict Peacebuilding working on international environmental issues. She is staff editor for *The Comparative Jurist* Blog and Treasurer for the Student Environmental & Animal Law Society. She plans to pursue a career in international and/or environmental law.

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, providing education and advice to a host of Virginia's decision-makers, from government officials and legal scholars to non-profit and business leaders.

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.

CONTACT US

Please contact
Elizabeth Andrews
(eaandrews@wm.edu)
if you have comments,
questions, or suggestions.

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. Recurrent Flooding and Sea Level Rise in Virginia
    A. Defining Relocation
    B. The Dillon Rule, Sea Level Rise and Relocation
    C. Public Trust Doctrine
    D. Property Rights
    E. National Flood Insurance Program
II. Resilience to Relocation
    A. The Virginia Code and Resilience to Relocation
    B. Resilience to Relocation Case Study: Tangier Island
        1.Strategies Employed & Envisioned
        2.Accomack County Comprehensive Plan
        3.FEMA, NFIP, and Tangier
    C. What Can We Learn from Tangier?
III. Relocating in Place
    A. The Virginia Code and Relocation in Place
    B. Relocation in Place Case Study: Poquoson
        1.Relocation in Place in Poquoson
        2.Poquoson Ordinance Regarding Elevating Homes
        3.Poquoson Comprehensive Plan and Hazard Mitigation Plan
        4.FEMA, NFIP, and Poquoson
    C. What Can We Learn from Poquoson?
IV. Relocating Nearby
    A. Relocation Nearby Case Study: Norfolk
    B. Strategies Employed & Envisioned: Vision 2100
        1.Citywide areas
        2.Red Areas
        3.Yellow Areas
        4.Green Areas
        5.Purple Areas
    C. What Can We Learn from Norfolk?
V. Relocating at a Distance
    A. Relocating at a Distance Case Studies
        1.Broadwater
        2.Shishmaref and Newtok
        3.Isle de Jean Charles
    B. What Can We Learn from These Communities?
VI. Conclusion

I. RECURRENT FLOODING AND SEA LEVEL RISE IN VIRGINIA

Recurrent flooding and sea level rise have been identified as Virginia's "highest probability/highest impact hazard."[1] Recurrent flooding is flooding that inundates the same area repeatedly over time, and can be triggered by precipitation events, high tides, or storm surges.[2] Relative sea level rise occurs as: (1) climate change causes the oceans to warm and expand, melting ice sheets and altering circulation patterns; and (2) land subsidence continues, which is attributable to isostatic glacial rebound and groundwater withdrawal.[3] Coastal Virginia is particularly vulnerable to recurrent flooding and sea level rise. It is estimated that recurrent flooding and sea level rise put 400,000 Virginia homes at risk, and the cost of rebuilding flooded residential property is predicted to be $92 billion, based on June 2014 estimated reconstruction values.[4] Additionally, a three-foot rise, considered to be a conservative rise, in sea level would submerge nearly 900 miles of roads in the Hampton Roads Planning District.[5]

The Virginia Institute of Marine Science (VIMS) projects four scenarios of sea level rise in Tidewater Virginia: historic (observed rates over the last century, incorporating no acceleration), low, high, and highest (estimated consequences of global warming combined with maximum possible ice-sheet melt).[6] These projections indicate that, by the end of the century, Virginia could see a potential sea level rise of more than five feet.[7]

Because so many Virginia residents will suffer the effects of recurrent flooding and sea level rise, coastal communities must begin considering questions like: How will communities address the challenges that rising water poses to established neighborhoods and businesses? Will they continue to provide services? At what point will homes and roads be raised, or locality services withdrawn? How can residents be involved and engaged in deciding their own fate?

To address these questions, University of Virginia architecture professor Alex Wall used a Resilience Research seed grant to work with Tanya Denckla Cobb, director of the UVa Institute for Environmental Negotiation to convene a Focus Group of coastal locality stakeholders. With the support and partnership of Michelle Covi, Assistant Professor of Practice, Virginia Sea Grant Climate Adaptation and Resilience Program, Old Dominion University/Virginia Sea Grant, a focus

---

[1] Recurrent Flooding Sub-Panel, *Recommendations to the Secure Commonwealth Panel on the Issue of Sea Level Rise and Recurrent Flooding in Coastal Virginia*, 3 (Sept. 5, 2014), http://ccrm.vims.edu/SCPRecommendationsReport_Sept2014.pdf.

[2] *Recurrent Flooding Study for Tidewater Virginia*, VIRGINIA INSTITUTE OF MARINE SCIENCE, 4 (Jan. 2013), http://ccrm.vims.edu/recurrent_flooding/Recurrent_Flooding_Study_web.pdf.

[3] *Commonwealth of Virginia Governor Terence R. McAuliffe's Executive Order 57 Work Group: Report and Final Recommendations to the Governor*, 2 (May 12, 2017), https://naturalresources.virginia.gov/media/9156/eo57-report-final-5-12-17.pdf [hereinafter *Commonwealth of Virginia*]; *Recurrent Flooding Study for Tidewater Virginia*, VIRGINIA INSTITUTE OF MARINE SCIENCE, 3 (Jan. 2013) http://ccrm.vims.edu/recurrent_flooding/Recurrent_Flooding_Study_web.pdf; Carl Hershner, Class Lecture for Virginia Coastal Policy Center, (August 29, 2017).

[4] *Commonwealth of Virginia, supra* note 3; Howard Botts, Thomas Jeffery, Wei Du, Morgan Suhr, *2014 CoreLogic Storm Surge Report*, 5 (July 2014), https://www.eenews.net/assets/2014/07/10/document_cw_01.pdf.

[5] *Commonwealth of Virginia, supra* note 3.

[6] *Sea Level Rise Scenarios*, VIRGINIA INSTITUTE OF MARINE SCIENCE, http://www.vims.edu/newsandevents/topstories/slr_scenarios.php (last visited Oct. 19, 2017).

[7] *Commonwealth of Virginia, supra* note 3.

group of eleven knowledgeable "thought leaders" from coastal localities, universities, and nonprofits gathered on August 30, 2016 to tackle the difficult (and dire) topic of relocation. Participants explored how at-risk coastal communities might conceptualize, plan, and implement the undesired and unwanted relocation of a neighborhood or community. The result of their work – *Community Relocation in the Face of Recurring Inundation: A Preliminary Framework* – is intended as a conversation starter, in hopes that others will build on this work to help coastal localities prepare for the challenges associated with possible community relocation.[8] This Paper is a continuation of the seed grant's efforts to discuss the challenges of relocating at-risk communities in coastal Virginia.

A. Defining Relocation

This Paper conceptualizes relocation for communities at high risk of recurrent flooding into four different categories: resilience to relocation, relocating in place, relocating nearby, and relocating at a distance. Definitions for these categories are briefly outlined below, with more detailed discussions, including case studies, to follow.

- **Resilience to Relocation** is defined as methods employed by a community or locality to stave off more dramatic relocation phases. Resilience strategies can include both "soft" and "hard" infrastructure. Examples of these resilience strategies include implementing natural or nature-based solutions, installing living shorelines, regenerating and preserving wetlands, digging retention basins, conducting dredge disposal projects, installing floodgates, or building sea walls.
- **Relocating in place** is relocation that is minimally invasive, allowing a household to stay in place by elevating the structure, moving to a different part of the lot, or, at most, moving down the street. In addition to retrofitting individual homes, communities also would have to consider raising selected roads as designated evacuation routes and addressing any inundated septic systems.
- **Relocating nearby** is relocation that requires a move beyond the immediate neighborhood, but allows the household to stay in the same general area. Ideally, the community is still familiar, children are able to attend the same school or stay within the same district, and working adults are able to maintain their jobs without enduring significantly longer commutes.
- **Relocating at a distance** is relocation that requires moving to a new, unfamiliar receiving community. This is the most disruptive and invasive relocation effort for both the uprooted and receiving communities. It will impact school districts for children and employment for working adults.

B. The Dillon Rule, Sea Level Rise, and Relocation

The Dillon Rule is a rule of statutory construction that is "used in construction of statutes delegating authority to local government."[9] Virginia is a Dillon Rule state, meaning that localities

[8] Tanya Denckla Cobb, Alex Wall & Michelle Covi, *Community Relocation in the Face of Recurring Inundation: A Preliminary Framework*, 2016 Coastal Focus Group, 7 (2016), https://ien.virginia.edu/sites/ien.virginia.edu/files/CommunityRelocationFramework_6TSone-page.pdf.
[9] The Dillon Rule, BLACK'S LAW DICTIONARY (6th ed. 1991).

can only take action where the Virginia Assembly has enabled them to do so.[10] Thus, the Dillon Rule is relevant to the relocation of at-risk communities and sea level rise because it dictates what actions localities are able to take.

The Dillon Rule requires a two-step analysis. First, the locality can only exercise powers that are: (1) expressly granted by the legislature; (2) necessarily or fairly implied from an express grant of authority; or (3) essential and indispensable in exercising those expressly granted powers.[11] Second, the locality must properly execute the power granted to it.[12] When the enabling authority specifies the method for implementing the power, localities may not use a different method.[13] However, when the enabling authority does not specify the method for implementation, localities have discretion, applying the "reasonable selection of method" rule.[14] If a locality exercised powers beyond those the General Assembly delegated, the locality can be sued for exceeding its authority in violation of the Dillon Rule.[15]

Some of the Virginia Code provisions that relate to sea level rise and relocation are:

- § 10.1-658: State interest in flood control;
- § 15.2-970: Construction of dams, levees, seawalls, etc.;
- § 15.2-2223: Comprehensive plan to be prepared and adopted; scope and purpose;
- § 15.2-2279: Ordinances regulating the building of houses and establishing setback lines;
- § 15.2-2280: Zoning ordinances generally;
- § 15.2-2283: Purpose of zoning ordinances;
- § 28.2-104.1: Living shorelines; development of general permit; guidance
- § 28.2-1100: Virginia Institute of Marine Science continued; duties; and
- § 62.1-229.5: Loans for living shorelines.[16]

The Code section that speaks most broadly to the issue of recurrent flooding and sea level rise is Virginia Code § 10.1-658, which declares flooding a state interest because flooding can often "result in the loss of life, damage to property, unsafe and unsanitary conditions and the disruption of commerce and government services, placing at risk the health, safety and welfare of those citizens living in flood-prone areas…[T]he public interest requires the management of flood-

---

[10] Lauren Gill, *The Dillon Rule and Sea Level Rise: An analysis of the impact of the Dillon Rule on potential adaptation measures the City of Poquoson may implement*, VIRGINIA COASTAL POLICY CENTER, 5 (2013), http://law.wm.edu/academics/programs/jd/electives/clinics/vacoastal/documents/march2014reports/dillonrulesealevel.pdf.

[11] *Marble Techs., Inc. v. City of Hampton*, 279 Va. 409, 417 (2010).

[12] Greg Kamptner, *Chapter 5: The Dillon Rule and Its Limitations on a Locality's Land Use Powers*, THE ALBEMARLE COUNTY LAND USE LAW HANDBOOK, 5-421 (July 2015), https://www.albemarle.org/upload/images/Forms_Center/Departments/County_Attorney/Forms/LUchapter05-dillonrule.pdf.

[13] *Id.*

[14] *Advanced Towing Co., LLC v. Fairfax County Bd. Of Supervisors*, 280 Va. 187, 193 (2010).

[15] Gill, *supra* note 10.

[16] *Commonwealth of Virginia Governor Terence R. McAuliffe's Executive Order 57 Work Group: Report and Final Recommendations to the Governor*, 12-14 (May 12, 2017) https://naturalresources.virginia.gov/media/9156/eo57-report-final-5-12-17.pdf; Gill, *supra* note 10, at 6; *Planning & Policy*, ADAPT VA, http://adaptva.org/info/planning_enab.html (last visited Nov. 9, 2017).

prone areas."[17] Further, § 10.1-658(B) continues by stating, "The General Assembly, therefore, supports and encourages those measures which prevent, mitigate, and alleviate the effects of stormwater surges and flooding."[18] These provisions lend localities authority to address current and future flooding that stems from sea level rise.[19]

C. Public Trust Doctrine

The Public Trust Doctrine "provides that submerged and submersible lands are preserved for public use in navigation, fishing and recreation and [the] state, as trustee for the people, bears the responsibility of preserving and protecting the right of the public to use the waters for those purposes."[20] In most states, intertidal land is owned by the state and held under the public trust doctrine; however, in Virginia, "the rights and privileges of the owners...shall extend to the mean low-water mark but no farther."[21] The Virginia Marine Resource Commission is charged with acting on the public's behalf to protect marine resources and publicly-owned submerged lands below the mean low-water mark.[22]

The Public Trust doctrine can become a defense to a Takings Clause challenge to a governmental exercise of police powers. Several coastal states such as South Carolina have applied this defense.[23] For coastal states, the "public-trust-doctrine-based defense would be that the government action in advancement or protection of public interests in the coastal lands and waters cannot constitute a taking."[24] In South Carolina, riparian owners own "all lands except beaches in the coastal zone between the mean high-water and the mean-low water mark of navigable waters."[25] Thus, it is possible this defense may be more difficult to apply in Virginia given the state's mean low water mark boundary for private ownership.

D. Property Rights

The consideration of property rights will be an underlying issue throughout the course of this Paper. What are the rights of the landowner? What about the tenant, if one is involved? At what point does the government's interest in relocating people at risk of recurrent flooding override the resident's interest in remaining on the land? While an in-depth delve into the details of property rights in Virginia are beyond the scope of this Paper, it is an important overarching concept to keep

---

[17] VA. CODE ANN. § 10.1-658 (1989).
[18] *Id.*
[19] Mary-Carson B. Saunders, *The Dillon Rule & Norfolk Sea Level Rise: An analysis of the limited impact of the Dillon Rule on planning for sea level rise in Norfolk*, Virginia Coastal Policy Center, 6 (2013), http://law.wm.edu/academics/programs/jd/electives/clinics/vacoastal/documents/march2014reports/dillonrulenorfolk.pdf.
[20] Public Trust Doctrine, BLACK'S LAW DICTIONARY (6th ed. 1991).
[21] VA. CONST. art XI, § 1; VA. CODE ANN. §§ 28.2-1200, 28.2-1201 (2014); Common Law & Statutes, ACCESSING THE VIRGINIA COAST, http://www.virginiacoastalaccess.net/law_statutes.html (last visited Oct. 19, 2017).
[22] Common Law & Statutes, ACCESSING THE VIRGINIA COAST, http://www.virginiacoastalaccess.net/law_statutes.html (last visited Oct. 19, 2017).
[23] Robin Kundis Craig, *Public Trust and Public Necessity Defenses to Takings Liability for Sea Level Rise Responses on the Gulf Coast*, 26 J. Land Use & Envtl. Law 395, 404 (2011).
[24] *Id.*
[25] S.C. CODE ANN. § 48-39-220 (1993).

in mind. In addition to this brief overview of property rights, each case study below will contain a short summary of relevant ordinances and laws that impact relocation within that community.

Property rights are "the rights given to the person or persons who have a right to own the property through purchase or bequest. These are basic rights in any society though absolute right for a property is rare in any society."[26] In short, property rights can be considered a "bundle of sticks:"[27] Each "stick" represents an individual right, and an owner possesses a "bundle" relating to the collection of rights to which she has a stake. For example, a title owner has the right to possession and use of the land, the right to lease or sell the land, the right to subdivide the land, and the right to create a covenant running with the land, amongst other rights.[28] Individually, each right is a stick; together, they create a bundle of rights. The government possess property rights as well. Several examples of a government's right include the right to collect property tax, enforce a lien, protect endangered animals and/or wetlands, and exercise the power of eminent domain.[29]

In Virginia, in the years following the American Revolution, Thomas Jefferson engineered legislation to keep the control of land wholly with the living—whereas prior to this, a landowner could restrict how future generations used or sold the land.[30] Following this, individuals tried more and more to cement individual rights in property over those of the government. However, in 1926, the United States Supreme Court clarified that the government has certain "police powers" over the use of land, such as zoning.[31] Governments also can control ownership in private land, are able to force the transfer of property from one citizen to another,[32] and can take land from a citizen through the exercise of the power of eminent domain.

Eminent domain is the government's right to force the sale or transfer of private land into the possession of the government.[33] There are restrictions on when the government can exercise eminent domain. These restrictions include the requirement that taking the land must be for the public use, such as building a necessary roadway, and the owners must be paid the fair value of the land.[34] The Virginia legislature has also taken several impactful steps in limiting the situations in which the government can acquire property by eminent domain. For example, Virginia Code § 1-219.1 restricts the term "public use" to the following:

> (i) the property is taken for the possession, ownership, occupation, and enjoyment of property by the public or a public corporation; (ii) the property is taken for construction, maintenance, or operation of public facilities by public corporations or by private entities provided that there is a written agreement with a public corporation providing for use of the facility by the public; (iii) the property is taken for the creation or functioning of any

---

[26] Property Rights, BLACK'S LAW DICTIONARY (6th ed. 1991).
[27] Jane B. Baron, *Rescuing the Bundle-of-Rights Metaphor in Property Law*, 82 U. CIN. L. REV. 57, 59 (2014).
[28] Robert C. Ellickson, *Two Cheers for the Bundle-of-Sticks Metaphor, Three Cheers for Merrill and Smith*, ECON JOURNAL WATCH 8(3) 215, 217 (2011).
[29] *Id.*
[30] *Local Zoning, Eminent Domain, and the "Bundle of Rights" in Virginia*, VIRGINIA PLACES, http://www.virginiaplaces.org/landuseplan/rightszoning.html (last visited Dec. 5, 2017).
[31] *See* Village of Euclid v. Ambler Realty Co., 272 U.S. 365 (1926).
[32] *See* Kelo v. New London, 545 U.S. 469 (2005).
[33] Eminent Domain, BLACK'S LAW DICTIONARY (6th ed. 1991).
[34] *See* Ramsey v. Comm'r of Highways, 2014 Va. LEXIS 140929, at *164 (Apr. 16, 2015).

> public service corporation, public service company, or railroad; (iv) the property is taken for the provision of any authorized utility service by a government utility corporation; (v) the property is taken for the elimination of blight provided that the property itself is a blighted property; or (vi) the property taken is in a redevelopment or conservation area and is abandoned or the acquisition is needed to clear title where one of the owners agrees to such acquisition or the acquisition is by agreement of all the owners.[35]

The Code defines blighted property as "any property that endangers the public health or safety in its condition at the time of the filing of the petition for condemnation" and is either a public nuisance or an individual commercial, industrial, or residential structure beyond repair.[36] The Virginia Legislature believes that ownership of private property is a fundamental right and, therefore, the land can only be taken when the public interest—such as building a necessary road, as seen in *Ramsey v. Commissioner of Highways*—dominates the private right and the primary purpose is not private financial gain, private benefit, an increase in tax base or revenues, or another similar situation.[37] The Legislature has also placed limits on the amount of land that can be taken[38] and preserved the rights of the individual landowner to challenge any exercise of eminent domain.[39]

As sea levels continue to rise and land continues to subside, the exercise of eminent domain may become more and more prevalent in the discussions regarding relocation. As sea levels in Virginia rise, the number of properties that must be removed as a "blighted property," public nuisance, or unfit for repair may rise with it. In addition to the obvious social and environmental impacts, rising sea levels will have a significant economic impact as well. A significant portion of the country's energy infrastructure—as well as transportation infrastructure—is situated in coastal areas and at risk to damage from sea level rise and flooding.[40] For example, Norfolk anticipates a $1 billion budget to construct floodgates and drains due to current and anticipated sea level rise and land subsidence.[41]

In order to help preserve the expensive infrastructure, as well as attempt to avoid as much of the environmental and social damage from flooding as possible, the government can take the property of landowners via eminent domain, or effectively take it through regulatory restriction. Most states, such as Virginia, have statutory authority to take private property under certain circumstances.[42] The property owner can challenge the government's action in court under several legal claims, such as alleging that the act is unconstitutional. However, challenging this in court could prove a lengthy and expensive process—something for which not every citizen would have the time or resources. For these individuals, recourse seems to be very limited.

---

[35] VA. CODE ANN. § 1-219.1.
[36] *Id.*
[37] VA. CODE ANN. § 1-219.1(B).
[38] VA. CODE ANN. § 1-219.1(C).
[39] VA. CONST. art I, § 11; VA. CODE ANN. § 1-219.1(E).
[40] J. Peter Byrne, *The Cathedral Engulfed: Sea-Level Rise, Property Rights, and Time*, 73 LA. L. REV. 69, 79 (2012).
[41] Darryl Fears, *Built on sinking ground, Norfolk tries to hold back tide amid sea-level rise*, WASH. POST, June 17, 2012, https://www.washingtonpost.com/national/health-science/built-on-sinking-ground-norfolk-tries-to-hold-back-tide-amid-sea-level-rise/2012/06/17/gJQADUsxjV_story.html?utm_term=.682108b87b44.
[42] VA. CODE ANN. § 1-219.1.

There are also incentives that localities can put into place, such as purchase and/or transfer of development rights programs—which can encourage voluntary relocation from repeatedly flooding areas due to a financial benefit. This list is not exhaustive, but, as mentioned previously, it is beyond the scope of this Paper to delve into more detail.

E. National Flood Insurance Program

One of the Federal Emergency Management Agency's (FEMA) tasks is to administer the National Flood Insurance Program (NFIP). The NFIP aims to reduce the impact of flooding on private and public structures through regulations and rules that must be followed—such as not building in current floodplains and limiting restoration that can occur on structures already within the floodplain. The NFIP also serves to provide affordable flood insurance to property owners. However, this insurance is only available to communities that choose to participate; single homeowners are ineligible to participate if they do not live in a community that also chooses to do so.[43] While this can be frustrating for a homeowner if they live in an ineligible neighborhood, this rule does serve to encourage communities to consider participating as a group and encourages potential purchasers to consider living in a participating community in order to be eligible for the NFIP.

Communities that participate in the NFIP can help reduce the costs of policyholder premiums by participating in the Community Rating System (CRS).[44] This program incentivizes communities to go beyond the requirements of the NFIP through activities like restricting development within the 100-year floodplain, citizen education programs, and conservation easement programs.[45] In Virginia, there are twenty-five communities participating in the CRS, totaling a savings of $3.36 million for more than 55,000 policyholders.[46]

The CRS is generally a beneficial program for localities to explore. For example, the benefit cost ratio calculated for the City of Norfolk's participation in the CRS is 68 to 1, with an average benefit cost ratio of 8 to 1 for all CRS-participating Virginia localities.[47] Of the twenty-five CRS-participating communities in Virginia, only two operate with a negative benefit cost ratio.[48]

The NFIP's efforts help to "mitigate the effects of flooding on new and improved structures" and attempts to reduce the socio-economic impact of disasters by promoting the purchase of flood insurance.[49] However, these attempts are not without criticism. One of the major

---

[43] *The National Flood Insurance Program*, FED. EMERGENCY MGMT. AGENCY, https://www.fema.gov/national-flood-insurance-program (last visited Dec. 4, 2017).
[44] *Floodplain Managemnt Program Major Elements*, VA. DEP'T CONSERVATION & RECREATION, http://www.dcr.virginia.gov/dam-safety-and-floodplains/fpelemnz (last accessed Dec. 2, 2017).
[45] *Id.*
[46] *Community Rating System*, WETLANDS WATCH, http://wetlandswatch.org/community-rating-system (last visited Dec. 4, 2017); *Floodplain Management Program Major Elements*, *supra* note 45.
[47] Mary-Carson Stiff, *The Costs & Benefits of the CRS Program in Virginia*, WETLANDS WATCH (Oct. 2017), https://static1.squarespace.com/static/56af7134be7b96f50a2c83e4/t/5a09fea153450af07cf6d652/1510604451611/Wetlands+Watch+VA+CRS+Cost+Benefit+Report.pdf.
[48] *Id.*
[49] *Id.*

criticisms of the NFIP is that the flood insurance risk maps, which FEMA uses to help determine insurance prices, are largely outdated.[50] For example, when Hurricane Harvey tore through Hitchcock, Texas in 2017, residents were unsure of the risk of their homes flooding because the flood maps had not been updated since 1983.[51]

FEMA lacks the resources and staff to keep all of the coastal flood maps updated for the more-than 20,000 communities participating in the NFIP.[52] These maps are supposed to be updated one of three ways: (1) FEMA-initiated map updates studies; (2) community-initiated revisions through Part 65 of the NFIP regulations; or (3) community-initiated map revisions through the Cooperating Technical Partners Program.[53] Every year, FEMA studies and restudies flood hazards across the U.S. but, because of funding constraints, these studies are limited to a select number of communities each year.[54] The other two methods by which FEMA's maps are updated are filed by the community seeking an update. However, these are not always accepted right away and FEMA has policies in place restricting revisions to an effective map unless the changes involve modifications to "Special Flood Hazard Areas."[55]

The extended period for which flood maps remain outdated makes it not only difficult for residents to know if their home is at risk for flooding and whether flood insurance would be a smart purchase, but also makes it difficult to plan communities and keep them appropriately placed and out of floodplains. Working from an outdated flood map, it is conceivable that entire neighborhoods are built in areas that appear safe on the map, but are in fact located in an area that is at risk for recurrent flooding. This only serves to further the social and economic damage suffered as a result of floods.

Furthermore, the U.S. Government Accountability Office (GAO) found that there were improvements that could be made within the NFIP to increase mitigation efforts by policyholders.[56] The GAO found that increasing mitigation efforts could produce savings for policyholders and federal taxpayers through reduced insurance losses, something which policyholders currently have no incentive to attempt to reduce.[57] However, in terms of relocation, the GAO also found that this might be met with resistance by communities that rely on at-risk properties for tax revenues, such as coastal communities.[58] As it stands now, many communities that suffer from recurrent flooding also are discouraged from relocation as the subsidized flood insurance ensures tax revenue continues to be collected while the property is continually repaired after damage.

---

[50] Michael Keller et al., *Outdated and Unreliable: FEMA's Faulty Flood Maps Put Homeowners at Risk*, BLOOMBERG (Oct. 6, 2017), https://www.bloomberg.com/graphics/2017-fema-faulty-flood-maps/.
[51] *Id.*
[52] *Flood Map Revision Process*, FED. EMERGENCY MGMT. AGENCY, https://www.fema.gov/flood-map-revision-processes (last visited Dec. 2, 2017); *Cooperating Technical Partners Program*, FED. EMERGENCY MGMT. AGENCY, https://www.fema.gov/cooperating-technical-partners-program (last visited Dec. 19, 2017).
[53] *Id.*
[54] *Id.*
[55] *Id.*
[56] U.S. GOV'T ACCOUNTABILITY OFFICE, GAO-16-190, NATIONAL FLOOD INSURANCE PROGRAM: OPTIONS FOR PROVIDING AFFORDABILITY ASSISTANCE (2016).
[57] *Id.*
[58] *Id.*

Another problem the NFIP faces is multiple loss properties.[59] These are homes and businesses that suffer from recurrent flooding, leading the owner to file repeated claims.[60] While these types of properties are a mere 2% of the NFIP's five million policies, they account for 30% of flood claims—totaling approximately $17 billion since the NFIP's commencement.[61]

Along with the NFIP, FEMA is also tasked with flood mitigation assistance. While there are a variety of grant programs FEMA manages, one example is the Flood Mitigation Assistance Grant Program (FMA). The goal of the FMA is to reduce claims under the NFIP by encouraging policyholders to take steps to mitigate potential flood damage before it occurs.[62] In fiscal year 2017, the FMA had $160 million available for community flood mitigation projects.[63] Eligible projects include infrastructure protective measures, stormwater management, wetlands restoration, and utility protective measures.[64] One infrastructure protective measure popular with homeowners is elevation of the house. When properly elevated, the living area of a house will be above all but the most severe floods—such as the 500-year flood.[65] This technique greatly reduces the damage, and therefore NFIP claims, caused by flooding and is one of the mitigation efforts the GAO supports.[66]

II. RESILIENCE TO RELOCATION

In addition to discussing various types of relocation, this Paper addresses resilience to relocation. For the purpose of this discussion, resilience to relocation is defined as methods employed by a community or locality to stave off more dramatic relocation phases. Resilience strategies can include the use of "soft" or "hard" infrastructure, or both.

"Soft" strategies generally involve creating or restoring natural or nature-based features. For example living shorelines may be constructed to mitigate erosion, but provide the additional benefits of improving water quality, supporting wildlife habitat, and maintaining coastal processes.[67] Soft strategies allow the shoreline to naturally migrate upland as sea levels rise, preserving valuable ecosystems.[68] Thus, soft techniques that promote naturally migrating living shorelines "do not include structures that sever the natural processes and connections between uplands and aquatic areas."[69] Beach replenishment is a soft approach that does not prevent erosion,

---

[59] Katie Leslie, *Some homes that repeatedly flood could lose insurance under proposed federal overhaul*, DAILY PRESS (Oct. 17, 2017), http://www.dailypress.com/news/politics/sns-tns-bc-flood-insurance-20171017-story.html.
[60] *Id.*
[61] *Id.*
[62] *See* THE STAFFORD ACT, FEMA 592 (codified as amended at 42 U.S.C. 5121 § *et seq.* (2016)); *Flood Mitigation Assistance Grant Program*, FED. EMERGENCY MGMT. AGENCY, https://www.fema.gov/flood-mitigation-assistance-grant-program (last visited Dec. 3, 2017).
[63] *FY 2017 Flood Mitigation Assistance (FMA) Grant Program*, FED. EMERGENCY MGMT. AGENCY, https://www.fema.gov/media-library-data/1499793315357-c31fef3839ece1533d9fccfe5caee71d/FMA_FactSheet_FY2017_508.pdf.
[64] *Id.*
[65] *Elevating Your House*, FED. EMERGENCY MGMT. AGENCY, https://www.fema.gov/pdf/rebuild/mat/sec5.pdf.
[66] U.S. GOV'T ACCOUNTABILITY OFFICE, *supra* note 56.
[67] *Soft Armoring*, WETLANDS WATCH, http://wetlandswatch.org/soft-armoring.
[68] *Id.*
[69] THE CITY OF NORFOLK CITY PLAN, *Living Shoreline Process*, https://www.norfolk.gov/DocumentCenter/View/15450 (Dec. 2, 2015).

but instead pumps sand onto an eroding shoreline to reduce damage to coastal infrastructure.[70] Soft techniques enhance aesthetics, add economic value, and are generally more cost-effective than "hard" techniques.[71]

"Hard" infrastructure has been the go-to approach for shoreline protection when valuable development and infrastructure is endangered.[72] Examples of hardening shorelines include: seawalls, jetties, bulkheads, floodgates, dikes, or levees. Using hard infrastructure to protect shorelines has a number of disadvantages. It is often extremely expensive to construct and maintain, requiring years of planning and securing funding sources before they can be implemented.[73] Instead of truly mitigating erosion, it merely shifts the burden downstream.[74] Additionally, they can fail catastrophically and perversely inspire further coastal development.[75]

A. The Virginia Code and Resilience to Relocation[76]

There are several Code sections relevant to soft strategies that can be used to increase a community's resilience to flooding.[77] First, Virginia Code § 15.2-2223.2 requires any locality in Tidewater Virginia to incorporate VIMS guidance on developing "the sustainability of shoreline resources," which identifies preferred shoreline management strategies to mitigate projected sea level rise, into the locality's next scheduled review of its comprehensive plan.[78] Second, Virginia Code § 28.2-1100 outlines VIMS duties referenced by Virginia Code § 15.2-2223.2.[79] Third, Virginia Code § 28.2-104.1 outlines and discusses the permitting process for implementing living shorelines.[80] Finally, Virginia Code § 62.1-229.5 speaks to loans that local governments can use for promoting living shorelines.[81]

Similar to soft strategies, there are several relevant Code sections for hard infrastructure.[82] First, Virginia Code § 10.1-658 relates to the State interest in flood control, which provides support and encouragement for mitigating flooding, stating that spending public funds on flood control and civil works projects are, therefore, necessities.[83] Second, Virginia Code § 15.2-970 specifically allows a locality to construct "a dam, levee, seawall or other structure or device or perform dredging," which has a purpose of preventing tidal erosion or flooding.[84] Finally, as previously mentioned, Virginia Code § 28.2-1100 outlines VIMS duties including research, studies, and management responsibilities.[85]

---

[70] *Beach Replenishment*, WETLANDS WATCH, http://wetlandswatch.org/beach-replenishment/.
[71] *Supra* note 67.
[72] *Hard Armoring*, WETLANDS WATCH, http://wetlandswatch.org/hard-armoring.
[73] *Id.*
[74] *Id.*
[75] *Id.*
[76] *Id.*; *Soft Armoring*, WETLANDS WATCH, http://wetlandswatch.org/soft-armoring.
[77] *See* VA. CODE ANN. §§ 15.2-2223.2; 28.2-104.1; 28.2-1100; 62.1-229.5.
[78] VA. CODE ANN. § 15.2-2223.2.
[79] VA. CODE ANN. § 28.2-1100.
[80] VA. CODE ANN. § 28.2-104.1.
[81] VA. CODE ANN. § 62.1-229.5.
[82] VA. CODE ANN. §§ 10.1-658; 15.2-970; 28.2-1100.
[83] VA. CODE ANN. § 10.1-658 (1989).
[84] VA. CODE ANN. § 15.2-970 (1997).
[85] VA. CODE ANN. § 28.2-1100 (2011).

B. Resilience to Relocation Case Study: Tangier Island

The town of Tangier is located on Tangier Island in the Chesapeake Bay; the Island is part of Accomack County.[86] According to the 2016 Census, the town of Tangier had a population of 722.[87] The Island has three miles of roads; and a one-foot rise in water level above mean higher high tide inundates all three miles.[88] In 2014, Tangier's poverty level was twenty-three percent, and the median household income sat at $38,056.[89] Tangier is known for its history, and is recognized on the National Register of Historic Places.[90] Many of Tangier's residents are "watermen," and strongly identify with their culture, traditions, and history.[91] Tangier has lost two thirds of its landmass since 1850; under mid-range sea level rise predictions, the Town will likely have to be abandoned in the next fifty years, while the high range predictions show it may need to be abandoned in twenty-five years.[92] As a result, Tangier residents are predicted to be among the first climate-change refugees in the continental United States.[93]

Tangier's residents are skeptical of sea level rise. Even Tangier's Mayor, James Eskridge, claims, "Our island is disappearing, but it's because of erosion and not sea-level rise," and his statements make it clear he does not believe it is caused by humans.[94] Residents love their Island and their unique heritage, and they are committed to staying on the island as long as possible; as one resident explains: "We really have not thought of Plan B…or it may be that Plan B scares me."[95] It is clear residents would rather prioritize strategies that provide resilience to relocation than consider relocation off the Island, at least for the time being.

Tangier is a special case. It should be noted that although this Paper uses it as an example of resilience strategies, it is a microcosm of the following three types of relocation: relocation in place as residents elevate their homes; relocation nearby as five upland ridges have become marshes since 1850, requiring residents to migrate within the island; and relocation at a distance

---

[86] EASTERN SHORE HAZARD MITIGATION PLAN 2016: TOWN OF TANGIER, Chapter 25, 1 (2016), http://www.a-npdc.org/wp-content/uploads/2016/04/Tangier-11072016.pdf; *Respecting the Past, Creating the Future: Accomack County Comprehensive Plan*, COUNTY OF ACCOMACK, VA., (2014), https://www.co.accomack.va.us/home/showdocument?id=2154.

[87] *Tangier Town, Virginia*, AM. FACT FINDER, (last visited Oct. 26, 2017), https://factfinder.census.gov/faces/nav/jsf/pages/community_facts.xhtml?src=bkmk.

[88] EASTERN SHORE HAZARD MITIGATION PLAN 2016: TOWN OF TANGIER, Chapter 25, at 5 (2016), http://www.a-npdc.org/wp-content/uploads/2016/04/Tangier-11072016.pdf.

[89] *Id.* at 2.

[90] Christa Marshall, *Virginia Islanders Could Be U.S. First Climate Change Refugees*, SCI. AM. (Dec. 11, 2015), https://www.scientificamerican.com/article/virginia-islanders-could-be-u-s-first-climate-change-refugees/.

[91] Jon Gertner, *Should the United States Save Tangier Island From Oblivion?*, N.Y. TIMES (July 6, 2016), https://www.nytimes.com/2016/07/10/magazine/should-the-united-states-save-tangier-island-from-oblivion.html?_r=1.

[92] David M. Schulte et al., *Climate Change and the Evolution and Fate of the Tangier Islands of Chesapeake Bay, USA*, SCIENTIFIC REPORTS, 1 (2015), https://www.nature.com/articles/srep17890.pdf.

[93] *Id.* at 6.

[94] Carol Vaughn, *Tangier mayor disputes cause of island's land loss on CNN's Al Gore town hall,* USA TODAY (Aug. 2, 2017), https://www.usatoday.com/story/news/nation-now/2017/08/03/tangier-mayor-disputes-cause-islands-land-loss-cnns-al-gore-town-hall/535327001/; Marshall, *supra* note 90.

[95] Schulte et al., *supra* note 92.

because residents will need to consider this drastic measure as erosion and sea level rise continue to threaten the Island.[96]

1. STRATEGIES EMPLOYED & ENVISIONED

Tangier already has a seawall extending one mile along its western shore that is credited with slowing erosion and protecting the Island's airport.[97] Unfortunately, this seawall is reportedly losing height due to storm action shifting and moving the seawall rocks.[98] Individual residents have elevated their homes and graded their land, but that does not prevent the sea level rise and the land subsidence.[99] In August 2017, President Trump called Mayor Eskridge, and told him not to worry about sea level rise, because "[y]our island has been there for hundreds of years, and I believe your island will be there for hundreds more."[100] Because the Island is "too poor" to fund projects on its own, it would be reliant upon funds from the state and federal government.[101]

The United States Army Corps of Engineers (USACE) is planning to build a jetty on the northwestern side of the Island to preserve a navigation channel, and some acknowledge the jetty will not stave off worsening floods.[102] The project was originally suggested in the mid-1990s and USACE completed an environmental assessment in 2016. As of October 2017, the project is not yet underway, although it is estimated to begin in 2018 if federal and state funding is secured.[103] The lengthy planning process and great expense of hard infrastructure to protect Tangier indicate it may not be the Island's best or quickest solution. Another solution that some residents hope for is a dredge and fill project following Poplar Island, Maryland's example. Poplar Island is uninhabited and sits about sixty miles north of Tangier in the Chesapeake Bay.[104] As Maryland dredges channels to maintain access to the Baltimore Harbor, it is carefully depositing the silt onto Poplar along with the installation of other hard boundaries, dikes, and infrastructure.[105] Although Maryland would be dredging anyway, this project is no small undertaking; estimates show it will cost $1.4 billion, which equates to about $800,000 per acre.[106] Tangier residents, like the town's manager, Renee Tyler, point out those efforts are being put towards an uninhabited island, so why

---

[96] EASTERN SHORE HAZARD MITIGATION PLAN 2016, *supra* note 88, at 14.
[97] Schulte et al., *supra* note 92.
[98] EASTERN SHORE HAZARD MITIGATION PLAN 2016, *supra* note 88, at 15.
[99] Schulte et al., *supra* note 92.
[100] Dave Mayfield, *Tangier Island is sinking and its residents are putting their faith in Trump*, THE VIRGINIAN PILOT (Aug. 2, 2017), https://pilotonline.com/news/local/environment/tangier-island-is-sinking-and-its-residents-are-putting-their/article_59eca236-c383-5603-98d0-ba0ae7ef562f.html?webSyncID=787533d1-d1d5-922a-1cb3-7461e853a4cb&sessionGUID=2eaa32d3-aeb2-0da9-104c-b94cceb5e4d4&_ga=2.218807135.797175793.1511996279-101978295.1511996278.; *The Inconvenient Science of Tangier Island*, THE BALT. SUN (Aug. 3, 2017 1:30 PM), http://www.baltimoresun.com/news/opinion/editorial/bs-ed-0806-tangier-island-20170803-story.html.
[101] Gertner, *supra* note 91.
[102] *Id.*
[103] *Id.*; *Draft Detailed Project Report Tangier Island Jetty Accomack County, Virginia Section 107 Navigation Study Appendix C Environmental Assessment*, U.S. ARMY CORPS OF ENGINEERS, (2016), http://www.nao.usace.army.mil/Portals/31/docs/civilworks/TangierJetty/Section%20107%20Navigation%20Study%20Draft%20Report/APPENDIX%20C%20-%20Tangier%20Jetty%20DRAFT%20Environmental%20Assessment.pdf; Marshall, *supra* note 90.
[104] Schulte et al., *supra* note 92.
[105] *Id.*
[106] *Id.*

not replicate the project to save the town of Tangier?[107] The USACE usually dredges Tangier's channels every five years, and using the dredge spoils to mitigate erosion is an increasingly popular idea.[108] However, those spoils are not sufficient on their own, and any work conducted by the USACE must be economically justified.[109] This economic justification is an obstacle, as transporting dredge material from farther locations is more costly.[110]

Other recommendations for Tangier involve the incorporation of soft strategies. David M. Schulte's article, *Climate Change and the Evolution and Fate of the Tangier Islands of Chesapeake Bay, USA* in Scientific Reports, recommends a breakwater system built offshore, with a dune system between the breakwaters and existing shoreline.[111] Schulte also proposes restoring Tangier Island using dredged sand and woody vegetation, spray dredging uninhabited areas, and fertilizing the Islands' wetlands to increase growth where spray dredging is not feasible.[112] Schulte estimates these recommendations would cost about $20-30 million.[113] It is important to reinforce Uppards Island, which currently loses about 10 feet of shoreline annually, because it helps shelter Tangier from northern currents.[114]

2. ACCOMACK COUNTY COMPREHENSIVE PLAN

The Accomack County Comprehensive Plan was adopted in May 2008, and amended in January 2016.[115] The Hampton Roads Planning District Commission's draft Coastal Resilience Report notes that Accomack's Comprehensive Plan addresses sea level rise and floodplain management by evaluating coastal management strategies and examining flood protection programs.[116] The Comprehensive Plan acknowledges that shoreline hardening is often expensive and potentially damaging because it impedes natural processes and migration of wetlands, and the county's Wetlands Board should discourage riparian owners from the use of hardening strategies.[117] Instead, it encourages non-structural alternatives and living shorelines.[118] Further, it calls for a comprehensive shoreline management plan for the county.[119] Interestingly, the Comprehensive Plan does not explicitly address Tangier and its special relationship with, and vulnerability to, sea level rise. The only time is it treated individually, is its designation within "Special Needs Populations" for purposes of the Hazard Mitigation Plan, arranging for Tangier residents to be evacuated and transported to shelters.[120]

---

[107] *Id.*
[108] EASTERN SHORE HAZARD MITIGATION PLAN 2016, *supra* note 88, at 7.
[109] Interview with Gregory Steele, Chief, Water Resources Division, Norfolk District, U.S. Army Corps of Engineers, in Williamsburg, Va. (Nov. 17, 2017).
[110] *Id.*
[111] Schulte et al., *supra* note 92 at 6.
[112] *Id.*
[113] *Id.*
[114] Schulte et al., *supra* note 92.
[115] *Respecting the Past, Creating the Future: Accomack County Comprehensive Plan*, COUNTY OF ACCOMACK, VA., (2014), https://www.co.accomack.va.us/home/showdocument?id=2154.
[116] *Draft Integrating Coastal Resilience into Local Plans, Policies, and Ordinances*, HAMPTON ROADS PLANNING DISTRICT COMMISSION, 56 (2017).
[117] *Draft Integrating Coastal Resilience into Local Plans, Policies, and Ordinances*, *supra* note 116 at 2-66.
[118] *Id.*
[119] *Id.*
[120] *Id.*, at 2-72.

As for floodplain management, Accomack County requires a two-foot freeboard.[121] Freeboard describes a margin of safety that is usually expressed in feet above the one-percent-annual chance flood level.[122] The county participates in the NFIP CRS and has a class 8 designation (classes are rated from nine to one, each lower class results in a five-percent-greater discount on flood insurance premiums), which allows for a ten-percent discount on flood insurance premiums for residents.[123] The Accomack County Floodplain Management Plan calls for preservation of floodplain areas as open space, and other management options like education and outreach concerning flooding, drainage system maintenance, and lower density zoning in floodplains.[124]

3. FEMA, NFIP, AND TANGIER

The Eastern Shore Hazard Mitigation Plan, adopted in 2016, provides excellent FEMA and NFIP-related information for Tangier. Tangier started participating in the NFIP in 1982.[125] As of 2016, there were seventy-eight NFIP policies on the island (the 2010 U.S. Census recorded 324 occupied housing units)[126], eleven of which are low-risk policies whose property owners are not required to carry flood insurance.[127] From 1982 to 2011, the Town filed a total of 87 flood insurance claims, averaging $10,705 per claim; from May 2011 through January 2016, the Town filed an additional 11 claims, averaging $13,348 per claim.[128] In total, premiums on the island are $63,852, covering $11,100,600 of assets, and payments since 1978 have reached a total of $1,078,159.[129]

Surprisingly, when FEMA created the new Flood Insurance Rate Maps (FIRM) in 2015, there was a net reduction of buildings on the island in the Special Flood Hazard Area.[130] Additionally, the new FIRM lowered the base flood elevation (BFE)[131] for the Zone A[132] from five feet to four feet.[133] The Hazard Mitigation Plan notes that this change comes "despite the complaint that some homes flood regularly," even when they are built at four feet BFE. The practical ramifications of this BFE is that since 2015, Accomack County zoning requires homes be built at

---

[121] ACCOMACK COUNTY, VA. § 106-364(a)(5) (2015). (However, a three-foot freeboard is cited in *Draft Integrating Coastal Resilience into Local Plans, Policies, and Ordinances*, HAMPTON ROADS PLANNING DISTRICT COMMISSION, 56 (2017) (forthcoming)).
[122] *Fact Sheet: Building Higher in Flood Zones: Freeboard - Reduce Your Risk, Reduce Your Premium*, FED. EMERGENCY MGMT. AGENCY (2014), https://www.fema.gov/media-library-data/1438356606317-d1d037d75640588f45e2168eb9a190ce/FPM_1-pager_Freeboard_Final_06-19-14.pdf.
[123] *Draft Integrating Coastal Resilience into Local Plans, Policies, and Ordinances*, *supra* note 116, at 2-72; *Fact Sheet: Federal Insurance and Mitigation Administration*, FED. EMERGENCY MGMT. AGENCY (2017), https://www.fema.gov/media-library-data/1507029324530-082938e6607d4d9eba4004890dbad39c/NFIP_CRS_Fact_Sheet_2017_508OK.pdf.
[124] *Draft Integrating Coastal Resilience into Local Plans, Policies, and Ordinances, supra* note 116, at 2-72.
[125] EASTERN SHORE HAZARD MITIGATION PLAN 2016, *supra* note 88, at 12.
[126] *Id.* at 4.
[127] *Id.* at 12-13.
[128] *Id.* at 12.
[129] *Id.* at 13.
[130] *Id.* at 12.
[131] The BFE is the level to which floodwaters are anticipated to rise during a base flood.
[132] Zone A, established by the FIRM published by FEMA and NFIP, is an area of Special Flood Hazard, but no base elevations are determined.
[133] EASTERN SHORE HAZARD MITIGATION PLAN 2016, *supra* note 88, at 12.

two feet above the FEMA BFE, but FEMA will not pay for homes to be built or raised beyond the FIRM's BFE.[134]

Some Tangier residents have used FEMA's Hazard Mitigation Grant Program (HMGP) to raise their homes. The HMGP will pay seventy-five percent of the project cost, and requires the last twenty-five percent to be paid by a private source or the state or local government.[135] Following Hurricane Isabel, which damaged ninety-nine homes and fifty businesses on Tangier, there were sixty-five residents requesting elevation projects.[136] The Town does not manage a HMGP grant, however Accomack County does and Tangier has used it to elevate homes on the Island.[137] Unfortunately, elevating homes through HMGP has become cost prohibitive.[138] Some homes on the Island have also been elevated by the Accomack-Northampton Planning District Commission using Disaster Recovery Initiative funds following Hurricane Floyd.[139]

C. What Can We Learn from Tangier?

As a case study, Tangier presents many interesting issues across the relocation spectrum. Relocation aside, Tangier sits at the intersection of politics and sea level rise. As one article puts it, "Tangier Island's steadfast rejection of climate change reflects the rigidity of American opinions about global warming, often defined along political party lines."[140] Tangier begs the question: How much are we willing and able to spend defending the coast? The costs of doing so in Tangier "would be astronomical."[141] As Michael Oppenheimer stated in the New York Times, "It's just a sad fact that we can't spend an infinite amount of money defending the coast…the concept of retreat, which is sort of un-American, has to be normalized. It has to become part of the culture. Because there are some places where we're really going to have to retreat."[142] This retreat will likely be necessary regardless of whether the Island's lost ground is believed to be attributed to erosion or sea level rise.

III. RELOCATING IN PLACE

This Paper defines relocation in place as strategies that are minimally invasive, allowing a household to stay in place by elevating the structure, moving to a different part of the lot, or, at most, moving down the street. In addition to retrofitting individual homes, communities also may have to consider raising selected roads as designated evacuation routes. While other strategies are included in the definition, this Paper will focus on elevating homes, as it is one of the most common

---

[134] EASTERN SHORE HAZARD MITIGATION PLAN 2016, *supra* note 88, at 12.
[135] *Two Tangier Island Homes Rise Above the Wrath of Hurricane Isabel,* FED. EMERGENCY MGMT. AGENCY (2011), https://www.hsdl.org/?abstract&did=682451.
[136] *Id.*
[137] EASTERN SHORE HAZARD MITIGATION PLAN 2016, *supra* note 88, at 13.
[138] *Id.* at 12-13.
[139] *Id.*
[140] Emily Flitter, *Residents of Republican-dominated US island refuse to acknowledge climate change despite rising sea level*, INDEP. (Oct. 24, 2017), http://www.independent.co.uk/news/world/americas/republicans-climate-change-shrinking-tangier-island-rising-sea-levels-virginia-chesapeake-bay-a8016566.html.
[141] *The Inconvenient Science of Tangier Island*, *supra* note 100.
[142] Schulte et al., *supra* note 92.

approaches to retrofitting homes within a floodplain.[143] Generally, this strategy requires lifting the home to build a new foundation, or extending an existing foundation.[144] Alternatively, the house may remain in place but a new elevated floor system is built within the home or another story is built and the ground level is converted.[145]

There are a number of factors to consider when elevating a home: elevation height, whether the existing foundation will be incorporated, building to withstand other hazards like wind and earthquakes, designing new access to the home, and which elevation technique to use.[146] If the home is substantially damaged or substantially improved, a locality's floodplain management ordinance, regulation, or building codes will require the lowest floor to be elevated to or above the BFE.[147] It is most economical to use as much of the existing foundation as possible.[148] Intuitively, larger and more complex homes are more difficult to lift, and multi-story homes are more difficult to stabilize.[149] The elevation technique used depends on the type of home. FEMA outlines techniques for elevating a home as follows: 1) elevating on extended foundation walls; 2) alternative elevation techniques for masonry homes on slab-on-grade foundations including elevating by extending the walls of the home or elevating by abandoning the lower enclosed area; and 3) elevating on an open foundation.[150] [151] Wetlands Watch, a nonprofit organization dedicated to protecting wetlands, considers elevating homes an important interim adaptation effort given its relatively low political cost, but Wetlands Watch considers it a short-term fix to a long-term problem.[152]

A. The Virginia Code and Relocation in Place

One Code section relevant to the elevation of homes is Virginia Code §15.2-2280, which speaks to zoning ordinances generally. This statute addresses building codes, design standards, freeboard requirements, and structure elevation.[153] A locality can designate its territory into districts, and each district can "regulate, restrict, permit, prohibit, and determine the following: 1. The use of land, buildings, structures… 2. The size, height, area, bulk, location, erection, construction, reconstruction, alteration, repair, maintenance, razing, or removal of structures."[154] Thus, regulating the processes involved in elevating a home to combat recurrent flooding falls within a locality's authority.

---

[143] *Homeowner's Guide to Retrofitting: Six Ways to Protect Your Home from Flooding*, FED. EMERGENCY MGMT. AGENCY, 5-1 (2014), https://www.fema.gov/media-library-data/1404148604102-f210b5e43aba0fb393443fe7ae9cd953/FEMA_P-312.pdf.
[144] *Id.*
[145] *Id.*
[146] *Id.* at 5-2.
[147] *Id.*
[148] *Id.* at 5-4.
[149] *Id.* at 5-6.
[150] *Id.* at 5-6-5-23.
[151] For a detailed discussion *see supra* note 144; *FEMA Region III Elevation* Guidelines (2012), http://www.vaemergency.gov/wp-content/uploads/drupal/FEMAR-IIIElevationGuidelines.pdf.
[152] *Structure Elevation*, WETLANDS WATCH, http://wetlandswatch.org/structure-elevation/ (last visited Nov. 9, 2017).
[153] *Planning & Policy*, ADAPT VA, http://adaptva.org/info/planning_enab.html (last visited Nov. 9, 2017).
[154] VA. CODE ANN. § 15.2-2280.

The Virginia Uniform Statewide Building Code (USBC), promulgated by the Virginia Board of Housing and Community Development, establishes minimum regulations for construction and maintenance.[155] The USBC is part of the Virginia Administrative Code.[156] Many provisions explicitly state as an exception that the section "shall not be construed to permit noncompliance with any applicable flood load or flood-resistant construction requirements of this code."[157] FEMA compiled excerpts of the flood provisions from the 2015 versions of the International Building Code, International Residential Code, International Existing Building Code, International Mechanical Code, International Plumbing Code, International Fuel Gas Code, International Fire Code, International Swimming Pool and Spa Code, International Private Sewage Disposal Code, and International Code Council.[158] This compilation is another detailed source for codes relevant to flooding and elevation.

B. Relocation in Place Case Study: Poquoson

Poquoson is considered a small suburban city in Virginia's Hampton Roads region.[159] Census data from 2016 estimated Poquoson's population at 12,017.[160] Additionally, the data estimates that: 1) there are 4,774 housing units; 2) the median value of owner-occupied housing units from 2011-15 is $307,800; and 3) the median household income 2011-2015 in 2015 dollars is $83,735.[161] Poquoson is recognized for having one of the highest household incomes in the Hampton Roads region and the state.[162] This is relevant because it indicates Poquoson residents will have more means than other communities in the region to put towards relocation. The City was previously part of York County, but was established as an independent town in 1952, and chartered as an independent city in 1975.[163]

Like many coastal communities, Poquoson has a rich history, especially as it relates to fishing and coastal resources. The City's name derives from a Native American term that is believed to mean "low lands", "flat land," or "great marsh."[164] It comes as no surprise that today it is threatened by sea level rise and recurrent flooding. As much as ninety percent of Poquoson sits in the floodplain, and most of the City is a mere four to seven feet above sea level.[165] The City

---

[155] *See generally* Virginia Uniform Statewide Building Code (2012).
[156] 13 VA. ADMIN. CODE § 5-63-10 to -550 (2014).
[157] *See, e.g., Id.* at §§ 5-63-30(C)(1), -30(D)(1), -30(E)(1).
[158] *2015 International Building Code: a compilation of flood resistant provisions*, FED. EMERGENCY MGMT. AGENCY (2015) https://www.fema.gov/media-library-data/1446030649587-10e447987a16b1313253361ed0871a46/2015_Icodes_Flood_Provisions_508_v2.pdf.
[159] *City of Poquoson Comprehensive Plan 2008-2028*, CITY OF POQUOSON, VA., 1-2 (2011), http://www.poquoson-va.gov/DocumentCenter/View/561.
[160] *Quick Facts: Poquoson city, Virginia*, U.S. CENSUS BUREAU, https://www.census.gov/quickfacts/fact/table/poquosoncityvirginia,poquosoncityvirginiacounty/AGE775216#viewtop (last visited Nov. 9, 2017).
[161] *Id.*
[162] *Quick Facts: Poquoson city, Virginia, supra* note 160; Aaron Applegate, *Poquoson takes action to outpace rising sea levels*, THE VIRGINIAN PILOT (Nov. 16, 2014), https://pilotonline.com/news/local/environment/poquoson-takes-action-to-outpace-rising-sea-levels/article_f18106b0-7d96-51c2-b1c6-47b3b34a58c8.html.
[163] *City of Poquoson Comprehensive Plan 2008-2028*, *supra* note 159, at 1-3.
[164] *Id.* at 1-6.
[165] Applegate, *supra* note 162.

has transitioned from a rural community to a suburban population with the construction and growth of the air force, military, and naval bases in the Hampton Roads area.[166]

Sea level rise is a "touchy subject" in Poquoson, according to the City's floodplain manager.[167] Residents either believe it is happening, or believe there is no proof for it and it just happens to be a trendy topic.[168] The Mayor himself admits that sea level rise is "really not one of the things that keeps me up at night."[169] However, he says that is primarily because, as a coastal community, Poquoson always has to "plan for an ever-changing environment."[170]

1. RELOCATION IN PLACE IN POQUOSON

Poquoson residents have elevated about 600 homes, approximately fifteen percent of the City's housing.[171] Elevating a home costs an average of $70,000 per project, and these projects are generally funded through insurance, public, and private sources.[172] This includes nearly every house within a mile of the waterfront marshes.[173] Generally, older homes are raised on brick or cinder block foundations, and newer homes are built one story off the ground with garages underneath.[174] In addition to elevating homes, the City mounded fill to create high ground where they rebuilt the elementary school, fire station, and sewer pump stations.[175] As for elevating roads, Poquoson plans to work with the state and the City of Hampton to elevate one of the main roads into the City ten feet above the wetlands.[176] The cost of the road elevation project is estimated to be sixty million dollars.[177]

2. POQUOSON ORDINANCES REGARDING ELEVATING HOMES

Poquoson can set forth requirements that guide elevating homes.[178] Poquoson's Floods Ordinance requires that buildings in coastal Zone A, "shall have the lowest floor elevated to or above the base flood elevation plus three feet of freeboard."[179] The ordinance also specifies that "[a] registered professional engineer or architect shall develop or review the structural design, specifications and plans for the construction."[180] Among other responsibilities, the floodplain administrator: interprets and provides base flood elevations, reviews elevation certificates, works

---

[166] *City of Poquoson Comprehensive Plan 2008-2028*, *supra* note 159, at 1-7.
[167] Applegate, *supra* note 162.
[168] *Id.*
[169] *Id.*
[170] *Id.*
[171] *Structure Elevation*, *supra* note 152; Applegate, *supra* note 162.
[172] Rex Springston, *Rising seas a major threat to low-lying Poquoson*, RICHMOND TIMES-DISPATCH (Dec. 9, 2012), http://www.richmond.com/news/virginia/rising-seas-a-major-threat-to-low-lying-poquoson/article_256f4839-f833-545c-9ca7-11eefe3314d4.html.
[173] Jennifer Weeks, *Whatever You Call It, Sea Leve Rises in Virginia*, SCI. AM. (Aug. 21, 2012), https://www.scientificamerican.com/article/whatever-you-call-it-sea-level-rises-in-virginia/.
[174] *Id.*
[175] Applegate, *supra* note 162.
[176] *Id.*
[177] *Id.*
[178] VA. CODE ANN. § 15.2-2280.
[179] POQUOSON, VA. § 42-31(10)(a).
[180] POQUOSON, VA. § 42-31(11)(b).

with FEMA to maintain FIRMs and address changes to base flood elevations, and keeps records like permits and elevation certificates.[181] In its FMA Floodplain Management Area Overlay District, the City's Zoning Ordinance dictates standards for elevating streets. If new, the road must be no lower than four and a half feet above mean sea level, but when extending an existing street, lower elevations can be approved by the city engineer as long as the elevations are not lower than the existing street.[182]

3. POQUOSON COMPREHENSIVE PLAN AND HAZARD MITIGATION PLAN

Poquoson's 2008-2028 Comprehensive Plan (the "Poquoson Plan") recognizes sea level rise and Poquoson's vulnerability to flooding, calling for it to be incorporated into future planning efforts and referring readers to the Hazard Mitigation Plan.[183] The Poquoson Plan identifies four development policies that should be adhered to in order to combat sea level rise in Poquoson: 1) minimize fill of land; 2) maximize vegetation preservation; 3) evaluate development and zoning ordinances for large properties inside and small properties outside the floodplain; and 4) address elevating roadways within the City.[184]

The Hazard Mitigation Plan (HMP) was updated in January 2015.[185] The HMP states that hazard mitigation practices, like elevating flood-prone homes, are ideally implemented prior to disasters.[186] It recognizes elevating homes as a way the City has helped residents mitigate flooding.[187] The HMP Committee "decided to continue relocation, and elevation measures for all flooded properties."[188] Two hundred of the City's homes were elevated using funds through the NFIP's Increased Cost of Compliance (ICC) coverage after flooding from Hurricane Isabel in 2003.[189] (Isabel resulted in Poquoson residents filing over two thousand flood insurance claims, totaling fifty-seven million dollars.[190]) ICC is part of most standard NFIP policies, and helps policyholders in need of additional help rebuild after a flood.[191] ICC will cover up to $30,000 of mitigation measures that will reduce future flood risk.[192] Additionally, the City secured four grants, from the Community Development Block Grant program and HMGP, to elevate another seventy homes between 2004 and 2007.[193] In November 2014, FEMA approved two more grants to elevate nineteen homes.[194] Poquoson's Hazard Mitigation Plan itself was funded by a grant

---

[181] POQUOSON, VA. § 42-22 (2014).
[182] POQUOSON, VA., app. A § 11.5-5(d).
[183] *City of Poquoson Comprehensive Plan 2008*-2028, *supra* note 159, at 5-3; *See generally Hampton Roads Hazard Mitigation Plan*, HAMPTON ROADS PLANNING DISTRICT COMMISSION (2017), https://www.hrpdcva.gov/uploads/docs/2017%20Hampton%20Roads%20Hazard%20Mitigation%20Plan%20Update%20FINAL.pdf.
[184] *City of Poquoson Comprehensive Plan 2008-2028*, *supra* note 159, at 8-15.
[185] HAZARD MITIGATION PLAN, CITY OF POQUOSON, VIRGINIA, at 6:3 (2015), https://www.ci.poquoson.va.us/DocumentCenter/View/681.
[186] *Id.*
[187] *Id.*
[188] *Id.*, at 7:5.
[189] *Id.* at 6:11.
[190] Applegate, *supra* note 162.
[191] *Increased Cost of Compliance (ICC) Fact Sheet*, FED. EMERGENCY MGMT. AGENCY (Oct. 24, 2017), https://www.fema.gov/media-library/assets/documents/1130.
[192] *Id.*
[193] HAZARD MITIGATION PLAN, CITY OF POQUOSON, *supra* note 186, at 6:11.
[194] *Id.*

through FEMA HMGP.[195] For homeowners and renters of flood-prone properties, it seems elevation is one of the best mitigation solutions, as the Poquoson City Manager's Office has stated that "[a]cquisition of flood-prone properties is not considered a viable alternative."[196] Property acquisition is the most permanent strategy for mitigating flooding,[197] but it also results in removing properties from the tax base. When communities qualify for funding, FEMA usually covers seventy-five percent of the cost, while the state or locality provides the last twenty-five percent.[198] However, buyouts must be initiated and administered by state and local governments with grant funding, rather than FEMA buying directly from homeowners.[199] So, if the City of Poquoson government is not on board, buyouts will not be an option.

4. FEMA, NFIP, AND POQUOSON

As the number of flood insurance policies has increased, Poquoson's HMP considers the City's promotion of flood insurance policies successful.[200] In February 2014, Poquoson residents had a total of 3,266 flood insurance policies, which provided about $858 million in coverage.[201] About eighty-four percent of those policies insure structures within the 100-year floodplain, and about eighty-three percent of all structures in the 100-year floodplain are covered by NFIP.[202] Poquoson has a number of repetitive loss (RL) properties. FEMA defines RL properties as those that have had at least two paid flood losses of more than $1,000 each in any ten-year period since 1978.[203] Further, FEMA defines severe repetitive loss (SRL) properties for single-family homes as those with four or more claims payments of $5,000 and cumulatively more than $20,000 within a ten-year period since 1978.[204] As of 2014, Poquoson had 971 RL properties, however the City estimates about 274 of these properties have been mitigated and/or elevated to protect from flooding.[205] Still, these 971 RL properties totaled $43 million in individual insured losses since 1985.[206] The number of SRL properties in Poquoson was thirty-five in 2013, which totaled over $3.5 million in claims in 2014.[207] FEMA aims to reduce RL properties nationwide.[208] With its large number of RL and SRL properties (which make up about one third of the City's policies) and subsequent claims, Poquoson illustrates why elevating homes is an approach communities are turning to in order to combat sea level rise and recurrent flooding.

---

[195] *Id.*
[196] *Id.* at 7:5.
[197] *For Communities Plagued by Repeated Flooding, Acquisition May Be the Answer*, FED. EMERGENCY MGMT. AGENCY (May 28, 2014), https://www.fema.gov/news-release/2014/05/28/communities-plagued-repeated-flooding-property-acquisition-may-be-answer.
[198] *Id.*
[199] *Id.*
[200] HAZARD MITIGATION PLAN, CITY OF POQUOSON, *supra* note 186, at 7:5.
[201] *Id.* at 5:7.
[202] *Id.*
[203] *Id.*
[204] HAZARD MITIGATION PLAN, CITY OF POQUOSON, VIRGINIA, at 5:7 (2015), https://www.ci.poquoson.va.us/DocumentCenter/View/681.
[205] *Id.*
[206] *Id.*
[207] *Id.* at 5:7-5:8.
[208] HAZARD MITIGATION PLAN, CITY OF POQUOSON, *supra* note 186, at 5:7.

C. What Can We Learn from Poquoson?

Poquoson shows us that while elevating homes can mitigate flooding concerns from sea level rise, this relocation strategy comes with its challenges. First, it is primarily a short-term fix, because rising seas will also impede road access to and from the home and nearby services. Second, it can be expensive. Not every homeowner or renter will be able to afford to raise their homes. Thus, it often requires securing funding assistance through the state or federal government, which can be a lengthy process. However, it is a good option for those who have the means and want to remain in their home as long as possible before rising seas force more drastic relocation measures.

Because elevating homes is a short-term solution to rising seas, these projects may be most successful when combined with other strategies. Specifically, homeowners or localities could consider adding other resilience strategies like "soft" infrastructure creating or restoring nature-based features. Alternatively, localities could pair relocation-in-place strategies with more long-term, comprehensive planning that contemplates relocation nearby or at a distance.

IV. RELOCATING NEARBY

Relocating nearby is essentially a relocation within the same school district, close to current employment, and with access to the same church, grocery store, and other amenities. While multiple cities are beginning to consider this form of relocation, within Virginia one of the prevalent localities working on relocating nearby is the City of Norfolk. There are several major components that tie into relocating nearby, such as costs and the local ordinances and procedural framework that impact relocation. This section will serve to analyze these components and their impact on what Norfolk has already done for relocation, as well as what Norfolk is planning for the future.

A. Relocation Nearby Case Study: Norfolk

In 2013, Norfolk was one of the first cities selected by the Rockefeller Foundation as a member of the 100 Resilient Cities (100RC) network.[209] As a member, Norfolk was recognized for its approach in addressing potential impacts of climate change in the coastal environment—particularly in addressing sea level rise.[210] Initially, Norfolk was addressing the issue of sea level rise as a single-solution problem: which communities would the City protect from sea level rise and which communities would be abandoned and "retreated" from?[211] However, through a 100RC conference, and input and feedback from individuals outside the City, Norfolk changed its approach and thinking. Instead of focusing on protecting small pockets, Norfolk instead turned to creating a vision for a long-term future that incorporated the entire City.[212] The City incorporated the idea that it is not only the communities at risk to flooding that will require assistance, but also those areas which will bear the burden of redevelopment and relocation.[213]

---

[209] *Vision 2100*, CITY OF NORFOLK 2 (Nov. 22, 2016), https://www.norfolk.gov/DocumentCenter/View/27768.
[210] *Id.*
[211] *Id.* at 3.
[212] *Id.*
[213] *Id.*

Much of Norfolk's current plan with respect to relocation is incorporated into its "Vision 2100" planning process. This plan, a part of its overall resiliency efforts, was adopted by Norfolk in the fall of 2015.[214] In adopting this plan, Norfolk has adopted the attitude that "the best way to get across the room, is by taking the first step."[215]

B. Strategies Employed & Envisioned: Vision 2100

Once Norfolk shifted its frame of mind from retreat to response, it developed different action plans for different parts of the City based on the risks specific areas were facing.

1. CITYWIDE AREAS

To begin with, Norfolk identified several actions that the entire City will focus on as the plan progresses. These include:

- Focusing on major infrastructure investments in the most resilient areas;
- Improving transportation connections;
- Being a model for responsibly addressing resilience;
- Creating tools and incentives to develop a more resilient housing market; and
- Seizing the economic opportunities of emerging resilience-based industries.[216]

The citywide goals Norfolk has laid out demonstrate that the City is committed to improving itself in the face of sea level rise and recurring flooding. By focusing on improved transportation and serving as a model for responsibly addressing resilience, Norfolk has committed itself to remaining where it is (due to the vital and immobile military installations and public universities) through 2100.[217] In addition to citywide goals, the Vision 2100 plan also implemented goals for specific areas of the City dependent on the flood risks and assets within each area.[218] These areas are color-coded in the Plan.

2. RED AREAS

Red Areas encompass the major economic engines of Norfolk. In these regions, the Vision 2100 plan stresses supporting the assets reliant on the water and for which relocation is simply not an option.[219] These economic hubs, such as Naval Station Norfolk, Old Dominion University, Tidewater Community College, Norfolk State University, and the "vibrant and growing downtown," are all either too dependent on the water to relocate, or too costly.[220] For these Areas, Norfolk mapped out five actions the City intends to focus on:

- Expanding the flood protection system;
- Building a comprehensive, 24-hour transportation network;

---

[214] *See generally Vision 2100*, CITY OF NORFOLK (Nov. 22, 2016).
[215] NorfolkTV, *Norfolk Perspectives with Bob Batcher 2015*, YOUTUBE (Dec. 22, 2015), https://www.youtube.com/watch?v=zbptR7WNaoA&index=2&list=PLW6nnehlYJS2_8PHZwLuIduTOUgtb7dj3.
[216] *Id.* at 21.
[217] *Id.* at 4.
[218] *Id.* at 11-12.
[219] *Vision 2100*, *supra* note 210, at 28.
[220] *Id.*

- Transforming less-intense uses into a denser, mixed-use pattern;
- Diversifying the housing options available to residents; and
- Strengthening and increasing economic diversity.[221]

These five actions all share a common theme; the economy. Norfolk has had a flood protection system in place since the 1970s, and their first action seeks to expand this system through a combination of hard and soft infrastructure to keep water away from key assets concentrated in the downtown area.[222] The 24-hour transportation system ensures that people are still able to move around, not only for safety reasons, but to "encourage street-level activity to the extent possible."[223] For example, as the largest employer in Norfolk, it is an economic necessity that access to Naval Station Norfolk remains available during flooding.[224] Encouraging additional development—particularly residential development—seeks to increase the utilization of public infrastructure and concentrate people in an area that will not only be free of most common flood events due to the flood protection system in place, but also keeps economic activity flourishing during some of the lighter flood events.

Norfolk has made it very clear that there are some areas that cannot be relocated, whether it is due to a necessity to be on the water such as the Naval Station or it is simply too difficult to relocate like the many higher education institutions. Their approach is a simple, yet possibly very effective one: Keep the economy as successful as possible in an attempt to keep revenue and activity high, which will help offset the harm suffered during major flooding events.

3. YELLOW AREAS

For Yellow Areas, where there is a long history of living with the water[225] and where many neighborhoods are, Norfolk detailed five different actions the City may take and/or consider in its struggle with sea level rise:

- Exploiting new and innovative technologies to reduce flood risk to the built environment;
- Focusing infrastructure investments on improvements that extend resilience;
- Educating residents about the risk of recurrent flooding;
- Developing mechanisms to allow property owners to recoup economic value lost to water rise; and
- Developing a solution for sea level rise adaptation in historic neighborhoods.[226]

Some of these actions are self-explanatory, such as exploiting new and innovative technologies to reduce flood risk to the environment. Staying on top of developing technologies is an important—but easy to forget—step. This also demonstrates the forward-thinking focus with which Norfolk is approaching the problem. It is not content developing a plan and then following it; Norfolk is constantly adjusting its plan as necessary.

---

[221] *Id.* at 27
[222] *Id.* at 29
[223] *Id.*
[224] *Id.* at 30-31.
[225] *Vision 2100*, *supra* note 210, at 34.
[226] *Id.* at 33.

However, some of the actions are more difficult to complete. For example, developing mechanisms to allow property owners to recoup economic value lost to water rise is a problem that experts have struggled with for decades—and it cannot be fixed with a new technology. Some of the areas Norfolk has marked as vulnerable will remain vulnerable, regardless of the steps the City takes. Currently, Norfolk participates in the NFIP, which serves as the most common tool to restore value to property owners impacted by flooding.[227]

This does not mean it is an effective tool. The NFIP faces a multitude of problems, as noted above. Flood zone maps are out of date, so those impacted may not know they are facing a reality of recurrent flooding. Furthermore, the mere fact a home may be located outside of a flood zone on the map does not protect the home from flooding. The NFIP is also slow to respond, potentially leaving homeowners to pay not only their mortgage but also repairs caused by the flooding. Norfolk has proposed some alternative tools to allow property owners to recoup economic value lost to water rise, however. These include a transfer of development rights (TDR) program and relaxing regulations on accessory and seasonal uses.[228]

A TDR program seeks to preserve the property owner's economic value in the land by moving it to another location where Norfolk desires the home to be built.[229] This voluntary program allows landowners to sell development rights from their land to a developer who can use the rights to "increase the density of development at another designated location."[230] While Virginia Code § 15.2-2316.2 authorizes localities to establish TDRs, Norfolk has not established a program due to substantial municipal code changes that must occur prior to the establishment of a TDR program.[231]

However, in Virginia, purchase of development rights (PDR) programs are more common—with 21 local state governments participating.[232] PDR programs "provide governmental compensation to landowners while restricting development on their land."[233] Specifically, in Virginia Beach, the PDR program is extremely successful—preserving over 9,265 acres as of 2015.[234] One of the advantages Virginia Beach had in developing such a successful PDR program was the rural land around the municipality where the government was able to restrict development.[235] While Norfolk lacks this luxury, a PDR program remains another option in addition to a TDR program.

---

[227] *Id.* at 36.
[228] *Id.*
[229] *See What Is a Transfer of Development Rights (TDR) Program?*, RUTGERS: N.J. AGRIC. EXPERIMENT STATION, https://njaes.rutgers.edu/highlands/tdr.asp (last visited Dec. 5, 2017).
[230] *Vision 2100*, *supra* note 210, at 24.
[231] *Id.*
[232] Jessica Lung & Michael Killius, TOOLS FOR A RESILIENT VIRGINIA COAST: DESIGNING A SUCCESSFUL TDR PROGRAM FOR VIRGINIA'S MIDDLE PENINSULA 3 (2016).
[233] *Id.*
[234] *Id.*
[235] *Id.*

4. GREEN AREAS

The Green Areas represent Norfolk's greatest opportunity for expansion and relocation nearby. These areas include wide roads, empty parking lots, and underutilized buildings.[236] Norfolk estimates that these Green Areas could easily accommodate the estimated 30,000-60,000 new residents that may live in Norfolk by 2100, as well as those residents already living in the City that must relocate.[237] Once again, Norfolk mapped out an action plan in their strategy for utilizing this precious space. They proposed to:

- Outline a land use and infrastructure pattern, developed around transit, to support new urban centers;
- Build the infrastructure necessary to support the new urban centers;
- Make realizing the long-term vision for these areas the central factor in all development decisions; and
- Capitalize on the opportunity to create a model urban form of development in these areas.[238]

Once again, Norfolk has demonstrated its commitment to looking beyond short-term and immediate problems and ensure that the grand scheme of Vision 2100 is being taken into account by outlining smaller-scale goals and measures of success which will ultimately result in working towards the grand goal of combating sea level rise and recurrent flooding as best as possible. Norfolk states that transformation of the Green Areas will take a generation or two, and it is vital to know how to respond to land-use requests that may not be compatible with the long-term goal of Vision 2100.[239] Instead of either letting the space remain unutilized for the time being, or committing to something that may ruin long-term plans completely, Norfolk aims to utilize short-term investments that require limited construction or investment. This ensures that the land is not being wasted presently, but that the long-term goal is still able to come to fruition.

5. PURPLE AREAS

The final section Norfolk includes in its plan are "Purple Areas," or locations throughout the City identified as lower risk locations without many key assets.[240] Many of these purple areas encompass stable neighborhoods with local parks, recreational amenities, and events residents value.[241] Due to the stable and residential makeup of these locations, the purple areas are not suitable for large-scale transformation.[242] Instead, the Vision 2100 plan focuses on small-scale enhancements in these areas, such as improved roadways and transit routes to the key assets in red and green areas, additional sidewalks, and enhanced parks and libraries.[243]

The four actions laid out in the plan to achieve these smaller-scale improvements are:

- Improving connection to the City's key assets;

---

[236] *Id.* at 38.
[237] *Id.*
[238] *Id.* at 37.
[239] *Id.* at 40.
[240] *Vision 2100*, *supra* note 210, at 16.
[241] *Id.* at 42.
[242] *Id.*
[243] *Id.*

- Prioritizing infrastructure investments that enhance neighborhood attractiveness;
- Maintaining housing affordability while improving economic value; and
- Redeveloping underperforming commercial and multifamily residential properties.[244]

C. What Can We Learn from Norfolk?

Norfolk presents a unique look into a locality that is approaching relocation nearby with such a forward-focused attitude. By recognizing that this problem is one that will be faced for decades to come, Norfolk has situated itself in a better position than most to prepare for the impacts. Norfolk recognizes that sea level rise will continue long after current city planners are gone, and therefore staff need to be planning for the long-term after they are gone as well. Norfolk is a great example of a city attempting to reinforce those areas that simply cannot be relocated, such as Naval Station Norfolk, while also pushing relocation and new development into less flood-prone areas within the City. This success can serve as a model to other localities in how they might approach various challenges through long-term resiliency planning and identification of strategies for different types of conditions within the community.

V. RELOCATING AT A DISTANCE

The final type of relocation this Paper considers is relocation at a distance. This requires moving to a new community or location. It is both disruptive and invasive for the rooted community, as well as the receiving community, if there is one. It requires new schools, new places of worship, new grocery stores, and potentially a new job. This is the rarest of the types of relocation, as most people understandably want to avoid moving an entire community if possible. Due to a scarcity of case studies, this Paper compares the little information available regarding the town of Broadwater, which was evacuated for good in 1941, with two relocations occurring in other parts of the country.

A. Relocating at a Distance Case Studies

Relocation at a distance is a large-scale relocation of entire neighborhoods or communities. It is the most expensive, most disruptive option of relocation available, but has the chance to be the most effective in avoiding future flooding. Problems associated with this form of relocation are not only the costs and the disruption it brings to the people forced to relocate away from their homes, but the disruption it brings to the receiving community as well. To relocate at a distance, either an already-established community must receive an entire group into facilities and establishments that may not be designed or capable to handle the increased capacity, or an entirely-new community must be constructed. Both can be time-consuming, expensive, and stressful for all parties involved. Due to the complications and severity of the decision to relocate at a distance, there are only a few current examples of this type of relocation today.

[244] *Id.* at 43.

1. BROADWATER

Broadwater was a town founded on Hog Island—a popular hunting, fishing, and tourist-based barrier island on the Eastern Shore of Virginia—in the mid-19th century.[245] Just after the Civil War, people were drawn to the island with "tales of adventure and limitless duck shooting."[246] Structures were erected, but they were built on the sand. The sand is easily susceptible to influence from decades of waves, as well as the strong storms that quickly move through the barrier islands. Photos from the town's heyday show fifteen to twenty houses along the main road, none of which—including the road—remain today.[247]

The once thriving town played host to a president-elect, and there were two coast guard stations, a church, and a post office. However, the barrier islands of Virginia move, and move quickly. Some of the islands move at rates of twenty or thirty feet per year, according to Dr. Christopher Hein of VIMS.[248] These movements occur from a combination of the significant storms that rip through the area, rising sea levels, and a lack of sand that ends up washed away.[249]

As Hog Island moved, the residents of Broadwater did what they could to try and remain. They raised their houses; they floated them on barges and moved them to higher ground.[250] After a particularly violent string of storms in the 1930s, the residents of Broadwater gave up. By 1941, everyone had left the island.[251] They moved their houses—floating them to the mainland and higher ground.[252] Nothing remains of Broadwater, save for the memories of the few surviving people who lived in the town.[253]

These survivors have defined some of the struggles of completely relocating a community. Some talk about how they no longer enjoy visiting the island, as it seems to warp their childhood memories from what the island used to be into what it is today; some think it is time to stop the reunions of the kids who lived on the island together.[254] As families slowly moved away from the island and scattered, people felt a loss of the community they had grown up in. The small size of the town—two stores and the single post office—resulted in a tight-knit community.[255] Feeling a loss of this community, some of the remaining survivors of the town began annual reunions in an

---

[245] *The Eastern Shore of Virginia: Strategies for Adapting to Climate Change*, THE NATURE CONSERVANCY 1 (2011), https://www.conservationgateway.org/ConservationByGeography/NorthAmerica/UnitedStates/virginia/Documents/VA%20Eastern%20Shore%20CC%20Adaptation%20Report%20Final.pdf.
[246] Diane Tennant, *The Eastern Shore island left behind*, THE VIRGINIAN PILOT (Jan. 16, 2011), https://pilotonline.com/life/the-eastern-shore-island-left-behind/article_12b4ad24-56a8-5c60-8f4f-e98efece65b2.html.
[247] *Id.*
[248] Nick Gilmore, *Virginia's Barrier Islands Are on the Move*, WVTF (Jan. 27, 2017), http://wvtf.org/post/virginias-barrier-islands-are-move.
[249] *Id.*
[250] Tennant, *supra* note 247.
[251] Gilmore, *supra* note 249.
[252] Tennant, *supra* note 247.
[253] *Id.*
[254] *Id.*
[255] *Id.*

attempt to keep that community close.[256] However, as their home has changed and those who had lived on the island number fewer and fewer, the conceptual community of Broadwater seems condemned to disappear.

2. SHISHMAREF AND NEWTOK

Nestled up in the western coastal region of Alaska sit two very small Eskimo villages—Shishmaref and Newtok. Both of these towns face similar problems of erosion which cause houses to collapse and the towns themselves to relocate.

In August 2016, Shishmaref's community of 500 voted to move the entire town off the rapidly eroding island to one of several potential locations on the mainland.[257] This is the second time this community has voted to relocate. They voted to relocate back in 2002, but logistical holdups and reservations of the receiving community caused all efforts to be put on hold. However, with the island's shoreline still rapidly eroding from sea levels rising, those efforts are underway again.[258]

There are, of course, logistical holdups still present. Relocating this small town will cost well over $100 million.[259] Not everyone was in favor of relocating the town. Of the 172 who voted, the city clerk's office reported that 94 votes favored relocating at a distance, but 78 votes favored protecting the community in place.[260] One of the villagers who favored relocation, Esau Sinnok, has moved 13 houses in 15 years due to the estimated 3,000 feet of land lost to coastal erosion over the past 35 years.[261] Sinnok said that he favored relocating because:

> Shishmaref will be underwater within the next three decades, and if we do not do anything, we'll be forced to move to another city . . . and not many people will move to the same place. So that means our unique community of Shishmaref will soon die out because we have our unique dialect of Inupiat Eskimo language, our unique Eskimo dancing . . . . All that will soon die out if we do not move as a community.[262]

A 2009 GAO report found that limited progress has been made on relocating Alaska Native villages threatened by both flooding and erosion.[263] Furthermore, some of these villages do not qualify for federal housing funds from The Department of Housing and Urban Development (HUD)'s Community Development Block Grant Program because there is no political subdivision of the state, such as a local government, to receive the funds.[264] The GAO noted that the exclusion

---

[256] *Id.*
[257] Mary Beth Griggs, *Community In Alaska Votes to Relocate Because Of Climate Change*, POPULAR SCIENCE (Aug. 22, 2016), https://www.popsci.com/community-in-alaska-votes-to-relocate-because-climate-change.
[258] Merrit Kennedy, *Threatened by Rising Seas, Alaska Village Decides to Relocate*, NAT'L PUB. RADIO (Aug. 18, 2016), https://www.npr.org/sections/thetwo-way/2016/08/18/490519540/threatened-by-rising-seas-an-alaskan-village-decides-to-relocate.
[259] Griggs, *supra* note 258.
[260] Kennedy, *supra* note 259.
[261] *Id.*
[262] *Id.*
[263] U.S. GOV'T ACCOUNTABILITY OFFICE, GAO-09-551, ALASKA NATIVE VILLAGES: LIMITED PROGRESS HAS BEEN MADE ON RELOCATING VILLAGES THREATENED BY FLOODING AND EROSION (2009).
[264] *Id.* at 42.

of Native villages from this fund adds to the difficulties unincorporated Native villages face in their efforts to relocate.[265]

Similar to Shishmaref, Newtok is facing up to 70 feet of land erosion per year—caused by the permafrost (or frozen soil) underground thawing.[266] As the land continually erodes away, the village's buildings are moved closer and closer to the water.[267] This town of 450 wants to move to a new village, located a mere nine miles away. Several of the villagers have already constructed houses in the new location. However, the majority of the village cannot afford to relocate. The USACE estimated an $80 to $130 million cost to relocate the village's key infrastructure.[268]

Villagers are attempting to piece together a quilt of state and federal funding, but Newtok is quickly running out of time. Newtok has already lost its barge landing, sewage lagoon, and landfill; they expect to lose their source of drinking water in 2017 and their school and airport by 2020.[269] In late-2016, the Village—acting on newly-established law allowing federally recognized Indian tribal governments to pursue a declaration directly from the president[270]—had asked President Obama, with input from FEMA, to declare a disaster area based on the damage from erosion and thawing permafrost.[271] This request was unanswered and, following the administration change, is not likely to be granted. If this request is granted, however, it could unlock the necessary funding for Newtok to relocate.[272]

Part of the problem is that the federal government has no policies in place to deal with relocation. While FEMA pushes communities to plan for climate change through programs like the NFIP, the federal government has yet to establish practices or guidelines for communities that must relocate in some fashion. While Newtok was able to directly request a disaster declaration from the president as a result of the Sandy Recovery Improvement Act,[273] as of now there has been no update to the situation in Newtok.[274]

3. ISLE DE JEAN CHARLES

Similar to the Native villages in Alaska, a small Native American community in south Louisiana is retreating off their island. Since 1955, Isle de Jean Charles has lost 98% of its land.[275] In January 2016, Isle de Jean Charles became the first community to receive federal tax dollars to

---

[265] *Id.*
[266] 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.
[267] *Id.*
[268] *Id.*
[269] *Id.*
[270] Federal Disaster Assistance, 44 C.F.R. § 206(B).
[271] Waldholz, *supra* note 267.
[272] *Id.*
[273] *The Disaster Declaration Process*, FED. EMERGENCY MGMT. AGENCY, https://www.fema.gov/disaster-declaration-process (last visited Dec. 2, 2017).
[274] *Id.*
[275] Kyle Mandel, *Trump abandons Obama-era plan to help climate refugees*, GRIST (Oct. 17, 2017), http://grist.org/article/trump-abandons-obama-era-plan-to-help-climate-refugees/.

help move an entire community relocating due to climate change.[276] The HUD approved grants totaled $1 billion to various states and cities across the United States to help adapt to—and recover from—climate change[277]; Isle de Jean Charles received $48 million of that total amount.[278]

Receiving funding to help relocate a community is not the only obstacle faced when considering relocation at a distance. For Isle de Jean Charles, these federal funds have to be spent by the year 2022—a seven-year period from receiving funds to fully allocating them.[279] Like those in Alaska, citizens of Isle de Jean Charles also expressed concern at losing culture and heritage. Chief Albert Naquin of the Biloxi-Chitimacha-Choctaw tribe, which most residents of Isle de Jean Charles belong to, has said he believes their heritage will "be history" after they relocate.[280]

Additionally, there is always a struggle in determining where the community will relocate. A year after receiving the federal funding, a location for the new community has still not been selected. The state is considering several sites about an hour's drive inland.[281] Naquin, in the application for HUD funding, specifically requested hurricane-proof houses arranged in an identical pattern to those on the island, a centralized community grocery store, and the capacity to bring together the more than 200 families who have since scattered after leaving the island.[282]

There is also an administrative "nightmare" associated with relocating at a distance, especially once federal funds come into play. Naquin has said that the process involves going through "a lot of red tape. A lot of bureaucracy."[283] The $48 million HUD grant was approved under the Obama administration and, as of now, the Trump administration has not tried to block or stall the grant. However, the Trump administration is limiting progress made by the communities in Alaska.[284] An Obama-administration memorandum established a working group of eleven different agencies to work together to support communities' migration away from vulnerable areas, "particularly those threatened by recurring natural disasters and the cumulative effects of severe environmental changes."[285] However, since the Trump administration took over, this working group has not met and the memorandum is lying dormant.[286] Naquin and the residents of Isle de Jean Charles have gone through two hurricane seasons since receiving the funding, and at the pace things are moving, it seems they may experience a third.

---

[276] Coral Davenport & Campbell Robertson, *Resettling the First American 'Climate Refugess'*, N.Y. TIMES (May 3, 2016), https://www.nytimes.com/2016/05/03/us/resettling-the-first-american-climate-refugees.html?_r=0.
[277] Press Release, Housing and Urban Development, HUD Awards $1 Billion Through National Disaster Resilience Competition, HUD No. 16-006 (Jan. 21, 2016) (https://www.hud.gov/press/press_releases_media_advisories/2016/HUDNo_16-006).
[278] *Id.*
[279] *Id.*
[280] *Id.*
[281] Sarah Kaplan, *'We're searching to reclaim what was lost': In museum archives, a tribe urgently seeks proof of its past*, WASH. POST (Nov. 11, 2017), https://www.washingtonpost.com/news/speaking-of-science/wp/2017/11/11/were-searching-to-reclaim-what-was-lost-in-museum-archives-a-tribe-urgently-seeks-proof-of-its-past/?utm_term=.5809b25ba68e.
[282] *Id.*
[283] Press Release, Housing and Urban Development, *supra* note 278.
[284] *Id.*
[285] *Id.*
[286] *Id.*

B. What Can We Learn from These Communities?

There are so many factors that play into relocating at a distance when compared to any of the other forms of relocation discussed in this Paper. Funding, deciding on a spot where people will want to go *and* where the existing community will receive them, fear of losing one's community and place-based heritage, and the administrative process all play a role in relocation. Additionally, because it is not something that occurs within a single location, there is an added complication of governments (local and federal) needing to communicate and agree with one another. This also can slow the process down.

However, for all the problems, this type of relocation also offers the most permanent solution. As long as localities think ahead and plan according to projected flood zones by avoiding them, it is entirely possible—even likely—that the community will not experience flooding to the same extent again. As more and more communities reach the realization they must relocate, it is likely that this process will become more centralized. For example, the federal government may develop policies that assist and govern the physical relocation—as well as assist in documenting the community's heritage and historical landmarks prior to relocation for preservation. Receiving communities may better understand what the process is like and how to prepare to receive an influx of people. Relocating communities may even find it is possible to relocate together and not completely lose their heritage and culture. Hopefully, this process occurs before it is too late for these communities.

VI. CONCLUSION

Recurrent flooding is a problem that impacts a significant portion of coastal communities in the United States, and it will continue to threaten coastal communities as the sea level rises. In Virginia, everything from the largest naval base in the world to a small island with a few hundred residents is impacted by flooding. To combat this, different forms of relocation can provide varying solutions. However, the type of relocation chosen is dependent on a wide range of contributing factors. These range from funding—as relocating an entire community or raising houses can be prohibitively expensive—to the local residents' political and personal views. Regardless of these views, however, communities will have a much easier time moving forward with proactive planning if they can focus on the impacts of recurrent flooding without engaging in political and personal debate distractions.

No matter the type of relocation chosen, one thing is clear: planning ahead can help alleviate many of the problems faced by relocating communities today. Norfolk's Vision 2100 plan lays a solid foundation for a city that cannot relocate at a distance, and Tangier's extensive work with the USACE promotes dialogue and the development of creative options for approaching the problems the Island faces. There is no "one size fits all" approach to relocating a community. The four relocation categories outlined (resilience to relocation, relocation in place, relocation nearby, and relocation at a distance) do not need to be implemented in isolation. In fact, they will likely have greater success when implemented in concert, as each strategy has its respective shortcomings and benefits. Choosing which relocation strategies to implement carries significant economic impacts, and can uproot families that have lived in the same place for generations.

Comprehensive federal policy and state action can make significant impacts in improving the efficiency with which relocation occurs, and should be a focus in implementing moving forward.