Balancing Act:
Water Quality Protection and Flood Resilience

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About the Author

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About the Virginia Coastal Policy Center

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

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.

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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.

VCPC is especially grateful to the Virginia Environmental Endowment for providing generous funding to support our work as well as to establish the clinic in fall 2012.

I. INTRODUCTION

Water is an integral part of life in coastal Virginia and has been for many generations. For many in the region, access to clean, safe water is essential for their survival and livelihood. Numerous industries, such as fishing, boating, aquaculture, and tourism rely on having high quality water in Virginia. The Commonwealth and its agencies stringently monitor and regulate water quality. Several statutory and regulatory schemes impose strict standards, which are designed to improve and ensure the quality of water.

Despite all of its benefits, water also brings many challenges to Virginia communities. Sea level rise, land subsidence, and storm surge are all contributing to and increasing the threat of recurrent flooding.[1] In 2014, it was estimated that recurrent flooding and sea level rise put thousands of Virginia homes at risk, costing homeowners and the Commonwealth millions of dollars.[2] Given the high stakes, it is now increasingly important to encourage flood resilience and mitigation measures, on both an individual and community level. The Commonwealth has been focused, with good reason, on protecting water quality for many years. However, it is now necessary for Virginia to also combat against recurrent flooding, in addition to protecting water quality.

Flood resilience efforts and laws designed to protect water quality may not always be compatible under current Virginia law. This paper will discuss two examples in particular. First, there can be tensions between the water quality goals under the Chesapeake Bay Preservation Act and efforts to conduct flood resilience projects within 100 feet of the shoreline in Tidewater Virginia. Second, there are significant challenges faced by localities seeking to comply with the Virginia Stormwater Management Program, while also continuing to mitigate the impacts of flooding. These two examples stem from the larger question facing Virginia: as flooding increases, how does the state balance water quality protection with the need for flood resilience?

II. Reconciling the Chesapeake Bay Preservation Act and Flood Resilience Strategies

The Chesapeake Bay Preservation Act (CBPA)[3] is an extensive piece of legislation, designed to improve the water quality of the Chesapeake Bay. While the Act's intent remains legitimate and important, its strict requirements and development restrictions can limit a landowner's ability to enact flood resilience measures on their property. This section will discuss two specific conflicts that can arise between the CBPA and flood mitigation efforts in Virginia. These potential conflicts stem from federally funded resilience projects and filling projects in low lying areas.

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[1] *See* MOLLY MITCHELL ET AL., RECURRENT FLOODING STUDY FOR TIDEWATER VIRGINIA vi-vii (2013), http://ccrm.vims.edu/recurrent_flooding/Recurrent_Flooding_Study_web.pdf (report to the Virginia General Assembly).

[2] *See* JEFFREY MOORE & LAUREN ACKER, VA. COASTAL POL'Y CTR., RECURRENT FLOODING, SEA LEVEL RISE, AND THE RELOCATION OF AT-RISK COMMUNITIES (2018), https://law.wm.edu/academics/programs/jd/electives/clinics/vacoastal/reports/relocation_final.pdf.

[3] VA. CODE ANN. §§ 62.1-44.15:67 to -79 (originally adopted in 1988).

A. An Overview of the Chesapeake Bay Preservation Act

The CBPA was enacted in 1988 as a "critical element of Virginia's non-point source management program."[4] The CBPA is designed to improve water quality in the Chesapeake Bay and surrounding waters, while also allowing for reasonable development, and the Act itself acknowledges that these are not mutually exclusive goals.[5] The Act is administered by the Virginia Department of Environmental Quality (DEQ), and the State Water Control Board oversees the implementation of CBPA regulations by Tidewater local governments.[6]

The Act requires localities to establish Chesapeake Bay Preservation Areas, which are then designated as either Resource Protection Areas (RPAs)[7] or Resource Management Areas (RMAs).[8] RPAs and RMAs are those areas that can impact water quality most directly, and thus the CBPA heavily regulates activity in these areas. Under the regulatory General Performance Criteria for Chesapeake Bay Preservation Areas, "[n]o more land shall be disturbed than is necessary to provide for the proposed use or development."[9] This paper will focus on the regulatory requirements facing landowners and localities in RPAs, because RPA lands are the most valuable lands protected by the CBPA, from a water quality perspective, and are often also the area's most critical for flood resilience.

RPAs "shall consist of lands adjacent to water bodies with perennial flow that have an intrinsic water quality value due to the ecological and biological processes they perform or are sensitive to impacts which may cause significant degradation to the quality of state waters."[10] Under the Act, a 100-foot buffer must be maintained landward of RPA components,[11] which serves to slow runoff, prevent erosion, and filter nonpoint source pollution from runoff.[12] Because "[n]on-point source pollution is a cumulative phenomenon,"[13] these vegetative buffers are particularly important for the protection of water quality. Notwithstanding "permitted uses, encroachments, and vegetation clearing," the 100-foot buffer is not to be reduced in width.[14] Activities in RPAs

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[4] *Chesapeake Bay Preservation Act*, VA. DEP'T OF ENVTL. QUALITY, https://www.deq.virginia.gov/Programs/Water/ChesapeakeBay/ChesapeakeBayPreservationAct.aspx (last visited Feb. 6, 2019).
[5] VA. CODE ANN. § 62.1-44.15:67(A) (2013).
[6] *Id.* § 62.1-44.15:69.
[7] *See* 9 VA. ADMIN. CODE § 25-830-80 (2015).
[8] *See id.* § 25-830-90 (2013).
[9] *Id.* § 25-830-130(1).
[10] *Id.* § 25-830-80A (2015).
[11] *Id.* § 25-830-80B(5). RPA components are defined as tidal wetlands; nontidal wetlands connected by surface flow and contiguous to tidal wetlands or water bodies with perennial flow; tidal shores; other lands considered by a local government to be necessary to protect the quality of state waters; and a 100-foot buffer adjacent to and landward of these four components and along both sides of any water body with perennial flow. *Id.* §§ 25-830-80B(1)-(5).
[12] *See* 9 VA. ADMIN. CODE § 25-830-140(3) (2013).
[13] Va. Dept. of Conservation & Recreation, *Resource Protection Area: Buffer Area Encroachment*, VA. REGULATORY TOWN HALL (Sept. 16, 2002, revised June 15, 2009), https://townhall.virginia.gov/L/GetFile.cfm?File=GuidanceDocs%5C440%5CGDoc_DEQ_5401_v1.pdf. The CBPA Program was administered by the Department of Conservation and Recreation until 2013, and this guidance has not been updated or replaced since the program was transferred to DEQ.
[14] *Id.*

are subject to the Act's General Performance Criteria,[15] as well as additional Development Criteria, which permit certain types of activity in an RPA buffer.[16] These permitted buffer intrusions are broken into three categories: development, encroachment, and modification. In addition, the CBPA allows local governments to grant exceptions to the RPA buffer requirements in certain circumstances.

i. Development in the RPA

Under the CBPA regulations, land development may be conducted within the RPA buffer in only six circumstances. Development is defined as "the construction or substantial alteration of residential, commercial, industrial, institutional, recreation, transportation or utility facilities or structures."[17] To be permitted, the development must: (1) be water dependent; (2) constitute redevelopment; (3) constitute development or redevelopment within a designated Intensely Developed Area; (4) be a new use subject to stringent requirements that are designed to minimize the impacts of the new use; (5) be a road or driveway crossing satisfying certain conditions; or (6) be a flood control or stormwater management facility that satisfies conditions under the regulations.[18] If proposed land development does not fall into one of these categories, it cannot be done in an RPA buffer without a granted exception.

ii. Encroachment in the RPA

New development may encroach into the RPA buffer if certain criteria are met and if the application of the buffer will result in the loss of buildable area on a lot or parcel.[19] For lots recorded before October 1, 1989, the encroachment must be the minimum necessary to achieve a reasonable buildable area for a principal structure and any utilities that are necessary.[20] If practical, a vegetative area shall be established elsewhere on the property, which should be equal in size to the encroached area and designed to help maximize water quality protection and mitigate the effect of the buffer encroachment.[21] Finally, the encroachment may not extend into the seaward 50 feet of the buffer area.[22] Additionally, for lots or parcels recorded after October 1, 1989, three more criteria must be met.[23]

The requirement that the encroachment must be the minimum necessary to achieve a reasonable buildable area contains a fundamental limit to these encroachment allowances: the intrusion, even if it meets all of the other criteria, is only permitted for principal structures and related necessary utilities.[24] Program guidance defines "principal structure" as "a house, which

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[15] 9 VA. ADMIN. CODE § 25-830-130 (2014).
[16] *Id.* § 25-830-140 (2013).
[17] *Id.* § 25-830-40 (2015).
[18] *Id.* § 25-830-140(1).
[19] *See id.* § 25-830-140(4).
[20] *Id.* § 25-830-140(4)(a)(1).
[21] 9 VA. ADMIN. CODE § 25-830-140(4)(a)(2) (2013).
[22] *Id.* § 25-830-140(4)(a)(3).
[23] *See id.* §§ 25-830-140(4)(b)(1)-(3). The lot must be the result of a legal proceeding in conformity with the local government's subdivision regulations; any conditions imposed by a previously approved exception must be met; and if best management practices (BMPs) were previously required, an evaluation of the BMPs must be conducted to determine if BMPs are still required.
[24] *See id.* § 25-830-140(4)(a)(1).

may include a front porch, and stairs etc. necessary for accessing the house" including an attached garage.[25] Changes can be made to the principal structure, so long as the original footprint is maintained.[26] However, the program guidance expressly states that "pools, gazebos, patios, free-standing decks or garages, or storage sheds" are not considered part of a principal structure.[27] This definition limits what structures can even be considered as permissible encroachment.

iii. Modifications in the RPA

Some modifications are permitted in the RPA buffer area.[28] Subject to local government approval, "vegetation may be removed," but "only to provide for reasonable sight lines, access paths, general woodlot management, and best management practices."[29] These best management practices can include shoreline erosion control projects and projects that control stormwater flow,[30] but beyond that, structural modifications are not allowed in the RPA.

iv. Local Government-Granted Special Exceptions in the RPA

Finally, the law does give local governments the ability to grant exceptions for non-conforming uses and non-complying structures in the RPA in certain circumstances.[31] These projects are not required to comply with the General Performance Criteria and the Development Criteria, which lay out the requirements for developing, encroaching in, or modifying the RPA buffer.[32] Six findings must be made by a local government before granting an exception, and the decision must be made pursuant to an administrative review procedure.[33]

The requested exception must: (1) be the minimum necessary to afford relief; (2) not confer any special privileges on the applicant that are denied to other property owners who are similarly situated; (3) be in harmony with the purpose and intent of the regulations and not of substantial detriment to water quality; (4) not be based on circumstances that are self-created or self-imposed; (5) include reasonable and appropriate conditions that will prevent a degradation of water quality; and (6) meet other findings, as appropriate and required by the local government.[34] While it is possible that granting an exception to one property owner to authorize efforts within the RPA to make the property more flood resilient gives a special privilege to that individual that has not been made available to other property owners who are similarly situated, that issue has not been directly addressed by program guidance.[35] Anyone may request an exception, and determinations are made on a case-by-case basis.

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[25] *Resource Protection Area: Buffer Area Encroachment, supra* note 13.
[26] *See* 9 VA. ADMIN. CODE § 25-830-140(1)(c) (2013) (encroachment into the RPA permitted "only if there is no increase in the amount of impervious cover and no further encroachment within the Resource Protection Area").
[27] *Id.*
[28] *See id.* § 25-830-140(5).
[29] *Id.*
[30] *See id.* § 25-830-140(5).
[31] *See id.* § 25-830-150.
[32] 9 VA. ADMIN. CODE § 25-830-150(C) (2013).
[33] *See id.* § 25-830-150(A)(1).
[34] *Id.* §§ 25-830-150(C)(1) (a)-(f).
[35] Telephone Interview with Department of Environmental Quality CBPA Program Staff (April 3, 2019).

While localities may be willing to grant special exceptions in some cases, pervasive encroachment can be very detrimental to water quality. While one non-conforming use or structure may not have a substantial impact on water quality, a whole shoreline full of them likely will. This balancing of economic development and water quality protection is why the granting of special exceptions is done on a case-by-case basis.[36]

B. FEMA Flood Resiliency Projects in the RPA Buffer

The Federal Emergency Management Agency (FEMA) defines "mitigation" as "the effort to reduce loss of life and property by lessening the impact of disasters."[37] FEMA encourages many activities designed to mitigate the effects of flooding, such as elevating properties to reduce the price of National Flood Insurance Program (NFIP) premiums. These elevation projects may require stairs or ramps that are built in the RPA of a site, setting up a potential conflict between CBPA water quality requirements and federally encouraged and/or funded flood resilience projects.

FEMA also incentivizes flood mitigation through funding of reconstruction, flood-proofing, and green infrastructure projects. For example, FEMA provides funding to states and localities through its Flood Mitigation Assistance (FMA) program. The goal of the program is to reduce NFIP claims, by providing funding for projects that decrease or eliminate long-term risk of flood damage to structures.[38] Individuals and businesses apply for FMA funding through sub-applicants, such as their local government, which then apply through applicants, most often the state.[39] In addition to the FMA program, FEMA administers the Hazard Mitigation Grant Program (HMGP)[40] and the Pre-Disaster Mitigation (PDM) Grant Program.[41] These programs are all designed to provide hazard mitigation assistance to state and local governments and incentivize investments that reduce risk.

Approved grants can be used for a variety of flood resilience projects, including structure elevation. For example, between 1997 and 2003, FMA grants were used to elevate twenty-three homes in Freeport, New York, an area that suffered from recurrent flooding.[42] Two other homes were elevated through the HMGP. As a result, all twenty-five elevated homes were unharmed and unaffected by Hurricane Irene and the resulting flooding in 2011.[43] FEMA holds out this example as a mitigation grant best practice.[44] The FMA and HMGP grants enabled the elevation of vulnerable structures and made twenty-five homes more resilient to flooding.

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[36] *See id.*; *see also* VA. CODE ANN. § 62.1-44.15:67(A) (2013).
[37] *What is Mitigation?*, FED. EMERGENCY MGMT. AGENCY, https://www.fema.gov/what-mitigation (last updated Sept. 19, 2018, 12:23 PM).
[38] *See Flood Mitigation Assistance Grant Program*, FED. EMERGENCY MGMT. AGENCY, https://www.fema.gov/flood-mitigation-assistance-grant-program%20 (last updated Dec. 03, 2018, 08:23 PM).
[39] *See id*. at "Eligibility."
[40] *See* 42 U.S.C. § 5170c (1988).
[41] *See id.* § 5133.
[42] *See* FED. EMERGENCY MGMT. AGENCY, GRANTS BEST PRACTICES: ELEVATION GRANTS MAKE MULTIPLE HOMES SAFER 2 (2016), https://www.fema.gov/media-library-data/1434651030127-c18ec65fc7dff012803d5ab3b3e440c8/Grants-BPs.pdf.
[43] *See id.* at 3.
[44] *See id.*

However, CBPA regulations may hinder homeowners' ability to effectuate a FEMA grant similarly in coastal Virginia. There may be situations when elevation, pursuant to a grant, requires encroaching upon an RPA buffer zone. According to FEMA's *Homeowner's Guide to Retrofitting*, "[e]levating a house usually requires that new means of access be provided," which may include "new staircases, elevators, or ramps."[45] If the elevated structure is an attached garage, the project may require constructing an elevated driveway or ramp.[46] These modifications are necessary if the elevated structure is to have any value, yet they may be prohibited in the RPA buffer.

Access stairs and ramps may not satisfy the requirements for development in the RPA, if they expand the original footprint of the principal structure. However, they may still be allowed under a special exception, if they are necessary in order to access the home and satisfy all of the special exception requirements.[47] A homeowner wishing to decrease NFIP premiums by elevating a home or garage, and thus improving its flood resiliency, may be out of luck if such elevation requires a buffer intrusion that does not qualify for a special exception.

There are several other federal funding sources for resiliency projects that may occur in an RPA. For example, the Community Development Block Grant (CDBG) Program, administered through the Department of Housing and Urban Development (HUD), "provides communities with resources to address a wide range of unique community development needs."[48] The National Oceanic and Atmospheric Administration (NOAA) "funds projects that are helping coastal communities . . . prepare for and recover from extreme weather events, climate hazards, and changing ocean conditions" through its Coastal Resilience Grants Program.[49] These programs may also authorize and encourage resiliency projects that intrude into the RPA buffer. At this point, the state has not issued guidance addressing these types of situations and whether some flexibility will be permitted.

C. Filling in the RPA Buffer

Another possible flood mitigation strategy involves placing fill to raise land in tidal areas to prevent flooding. While this activity may be effective in increasing flood resilience, it certainly qualifies as a land-disturbing activity under the CBPA if done at a sufficient scale.[50] Thus, filling

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[45] FED. EMERGENCY MGMT. AGENCY, HOMEOWNER'S GUIDE TO RETROFITTING, ELEVATING YOUR HOUSE, 5.1.4 (3rd ed. 2014), https://www.fema.gov/media-library-data/1404149533512-1d5f2eed3a2b33666b2500dd67d24cfc/FEMA_P312_Chap_5.pdf.

[46] *See id.*

[47] *See* 9 VA. ADMIN. CODE § 25-830-150 (2013).

[48] *Community Development Block Grant Program*, U.S. DEPT. HOUS. & URBAN DEV., https://www.hud.gov/program_offices/comm_planning/communitydevelopment/programs (last visited June 18, 2019).

[49] Nat. Oceanic & Atmospheric Admin., *NOAA Coastal Resilience Grants Program*, OFFICE FOR COASTAL MGMT., https://coast.noaa.gov/resilience-grant/ (last visited June 17, 2019).

[50] *See, e.g.*, 9 VA. ADMIN. CODE § 25-830-130(5) (2014) ("Any land disturbing activity that exceeds an area of 2,500 square feet (including construction of all single family houses, septic tanks and drainfields, but otherwise as defined in § 62.1-44.15:51 of the Code of Virginia) shall comply with the requirements of the local erosion and sediment control ordinance."); VA. CODE ANN. § 62.1-44.15:51 (2018) ("'Land disturbance' or 'land-disturbing activity' means any man-made change to the land surface that may result in soil erosion or has the potential to change its runoff characteristics, including the clearing, grading, excavating, transporting, and filling of land.").

in an RPA buffer area would be prohibited, unless it falls under one of the CBPA permitted intrusions discussed above. Perhaps there is good reason to allow filling in the buffer if its intent is to prevent flooding, but in most circumstances, this activity also could harm water quality.[51]

In 2018, Virginia Delegate Keith Hodges introduced House Bill 1094 in the state legislature, which would have enabled a landowner to "raise the base elevation of his land for the purpose of mitigating the effects of flooding."[52] The bill was ultimately withdrawn by the patron, but prompted a study by the Virginia Institute of Marine Science (VIMS) into the feasibility of using fill in the RPA buffer to increase flood resiliency, while still adhering to the water quality protection objectives of the CBPA. The report found that "providing flooding protection through the placement of fill material within the RPA, while not impacting existing wetlands or water quality in adjacent perennial waterbodies appears possible for only a restricted set of circumstances."[53]

The report further noted that, in most situations, filling in the RPA creates a barrier to wetland migration necessitated by sea level rise.[54] Placing fill in the RPA that increases the slope above 5% would negatively impact water quality by decreasing infiltration, increasing runoff, and potentially destroying needed vegetation.[55] Thus, in many if not most circumstances, raising land by filling in the RPA buffer cannot be achieved without sacrificing some level of water quality.

During the 2019 legislative session, Delegate Hodges introduced another bill, which would have directed the State Water Control Board to adopt regulations allowing residential landowners to deposit appropriate fill material in the RPA in order to manage recurrent flooding problems.[56] This bill did not pass out of the House Agriculture, Chesapeake and Natural Resources Committee.

Under the CBPA and other state laws, Virginia localities can largely protect wetland areas from filling.[57] However, it is possible to obtain approval for certain erosion control projects in an RPA, such as living shoreline projects.[58] For example, a living shoreline was recently approved on a waterfront property in Virginia Beach as an erosion control mechanism.[59] This project was likely considered a shoreline erosion control project under the CBPA, and thus received approval as a permitted modification in the buffer area.[60]

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[51] MARK W. LUCKENBACH ET AL., REPORT TO THE CHAIRMAN OF THE HOUSE COMMITTEE ON AGRICULTURE, CHESAPEAKE AND NATURAL RESOURCE PURSUANT TO HOUSE BILL 1094 at 2, 5 (2018) 1094 [hereinafter VIMS Report] (available from the author).
[52] H.B. 1094 Reg. Sess. (Va. 2018).
[53] VIMS Report, *supra* note 51.
[54] *See* VIMS Report, *supra* note 51, at 10.
[55] *See* VIMS Report, *supra* note 51, at 10.
[56] H.B. 2506 Reg. Sess. (Va. 2019).
[57] *See, e.g.*, *Stratford Marine Corp. v. Fairfax County Bd. of Sup'rs*, 8 Va. Cir. 153 (Va. Cir. Ct. 1986) (upholding the denial of a fill permit and noting that "[t]he protection of wetlands is by now the well-settled policy of this State.").
[58] *See* 9 VA. ADMIN. CODE § 25-830-140(5)(a)(4) (2013).
[59] *See* Allissa Bunner, *Living Shoreline is Answer to Stop Erosion on this Waterfront Property*, VIRGINIA PILOT (April 6, 2019), https://pilotonline.com/life/home/lawn-garden/article_9a581144-5581-11e9-8988-fbb1ad8b0af1.html.
[60] *See* 9 VA. ADMIN. CODE § 25-830-140(5)(a)(4) (2013).

Filling in the RPA buffer implicates several other Virginia permitting requirements. Even if a filling project were to be allowed in compliance with the CBPA buffer encroachment or special exception requirements, the project would still need to satisfy a number of other permitting requirements, such as those under the Virginia Stormwater Management Program,[61] Virginia Erosion and Sediment Control Program,[62] and the Virginia Water Protection Permit Program.[63]

D. Ensuring Water Quality Protection and Encouraging Flood Resiliency

The Commonwealth's laws sometimes fail to appropriately consider water quality goals in conjunction with flood resiliency measures. Under current law, any permitted RPA buffer intrusion must meet the strict water quality standards of the CBPA. While such considerations are very important, water quality is not the only concern in tidal Virginia, where sea level rise, storm surge, and flooding are a regular threat. Some flood mitigation projects, such as structure elevation or the filling of properties, do not fall under one of the specified permitted uses or encroachments in the RPA buffer. While the regulations on their face do not prohibit elevating a home in a matter that encroaches into the RPA buffer, they do require a homeowner to satisfy a local analysis. Some projects may attain approval through the local special exception process, but even those decisions will be very fact- and locality-specific. The CBPA does not have an express mechanism for balancing water quality protection in the RPA with the benefits of flood resiliency efforts.

Maryland has designated Critical Areas (CAs) under the Critical Area Act of 1984, which contain 100-foot buffers similar to Virginia's RPA buffers.[64] Maryland defines a Critical Area as "all water and land areas within 1,000 feet beyond the landward boundaries of State or private wetlands and the heads of tides,"[65] with a buffer zone at least 100 feet wide immediately along the shoreline.[66] All land within the CA is given one of three land classifications that affect what specific regulations and procedures apply; these are given based on the density of the area and how the land is predominantly used.[67] From most to least regulated these are: Resource Conservation Areas (RCAs) (1 dwelling per 20 acres or less), Limited Development Areas (LDAs) (1 dwelling per 5 acres to 4 dwellings per acre), and Intensely Developed Areas (IDAs) (land of "twenty or more adjacent acres where residential, commercial, institutional or industrial land uses predominate").[68] Generally all development activities within the non-tidal wetlands buffer zones or farmed wetlands inundated for 15 or more consecutive days require permits or variances.[69] Maryland has simplified management plan requirements for specific enumerated activities within

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[61] *See* VA. CODE ANN. §§ 62.1-44.15:24 to 15:50 (2018); 9 VA. ADMIN. CODE §§ 25-870-10 to -830 (2018).
[62] *See* VA. CODE ANN. §§ 62.1-44.15:51 to 15:66 (2018); 9 VA. ADMIN. CODE §§ 25-840-10 to -110 (2016).
[63] *See* VA. CODE ANN. §§ 62.1-44.15:20 to 15:23.1 (2019); 9 VA. ADMIN. CODE §§ 25-210-10 to –610 (2019).
[64] *See* MD. CODE ANN., NAT. RES. § 8-18.
[65] MD. CODE REGS. 27.01.01.01(B)(18)(b)(iii) (2019). Except areas excluded under MD. CODE ANN. NAT. RES., § 8-1807(d). *Id*.
[66] *Id*. at (B)(8)(b)(i); ADKINS ARBORETUM & THE CRITICAL AREA COMM'N FOR THE CHESAPEAKE & ATL. COASTAL BAYS, THE GREEN BOOK FOR THE BUFFER 6 (2012) [hereinafter GREEN BOOK].
[67] *Development in the Critical Area*, MD. DEPT. NAT. RES., https://dnr.maryland.gov/criticalarea/Pages/development_in_CAC.aspx (last visited June 28, 2019).
[68] GREEN BOOK, *supra* note 66; *Development in the Critical Area*, Md. Dept. Nat. Res., https://dnr.maryland.gov/criticalarea/Pages/development_in_CAC.aspx (last visited June 28, 2019).
[69] *Nontidal Wetlands Regulations and Development Activities*, MD. DEPT. ENV'T., https://mde.state.md.us/programs/Water/WetlandsandWaterways/DocumentsandInformation/Documents/www.mde.state.md.us/assets/document/WetlandsWaterways/development.pdf (last visited June 24, 2019).

the buffer zone, including projects such as providing access to a private pier or manually removing invasive or noxious vegetation.[70] Maintaining an existing lawn in the buffer zone is exempt from the management plan requirements entirely.[71] Similar to Virginia, Maryland uses a case-by-case permitting process for any development within the CA. For example, in *Caldes v. Elm St. Dev.*, the court upheld a variance permit that allowed development of seven lots from an undeveloped property within the RDA as long as the developer worked stepwise while developing the lots, so that each new lot was stabilized before construction would continue.[72] The court also required that all new lots have stormwater BMPs, rain gardens and other specific measures to prevent non-point source pollution and run-off.[73]

One solution is to give localities more flexibility to address water quality and flood mitigation at the same time. In Smithville, Maryland, marsh encroachment and flooding are threatening the local New Revived Methodist Church.[74] The Church lies within both the LDA and the buffer zone, but was able to level out low-lying, non-wetland areas behind the building to maintain the grade of the existing lawn on the site.[75] While the Church was able to implement some resiliency measures within the current regulatory framework, individuals involved with the project suggested that more regulatory flexibility, such as additional exemptions, would make it easier for rural communities to implement resiliency measures, while still maintaining high water quality standards.[76] Maryland's Critical Area Commission has also developed a Coastal Resilience Planning Guide for localities. [77] While the guide gives a great overview of how to plan resiliency efforts in the critical area, and shows where Maryland's water quality and legal framework can be flexible enough to implement the guide's recommendations, development of areas within the CAs will still require variances and exceptions and compliance with all CA requirements.[78]

To find the right balance between water quality protection and flood resilience, the Commonwealth likely needs to revise or clarify portions of the CBPA. Certain stand-alone water quality restrictions may no longer be feasible, given the increasing need to address flooding and improve resilience. The state legislature could add language to the CBPA to allow for flood mitigation measures in the RPA buffer as long as a certain level of water quality is maintained, which could be determined by a Water Quality Impact Assessment.[79] For example, the permitted uses and encroachments in the RPA buffer could be expanded to include resiliency measures. Alternatively, localities could be authorized to unilaterally decide that certain types and sizes of resiliency projects are acceptable from a water quality perspective if they are conducted according to specified restrictions, and thus create a broad special exception applicable to anyone seeking to

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[70] MD. CODE REGS. 27.01.09.01-3(H)(1) (2019).
[71] *Id*. (A).
[72] 999 A.2d 956, 957, 969 (Md. 2010).
[73] *Id*.
[74] *See* Rona Kobell, *Smithville Tries to Stem the Tide*, 17 CHESAPEAKE Q., NO. 3 & 4, Dec. 2018, at 3-6, http://www.chesapeakequarterly.net/V17N34/main1/.
[75] Liz Van Dolah, Christy Miller Hesed, & Michael Paolisso, Marsh Migration and Human Relocation: Finding a Fair Path Forward (Feb. 5, 2019), http://chesapeakebayssc.org/wp-content/uploads/2019/02/Marsh-Summit-Talk_FINAL_compressed.pdf.
[76] *Id.*
[77] ALEXANDRA DEWEESE, CRITICAL AREA COASTAL RESILIENCE PLANNING GUIDE (2016, rev. 2017), https://dnr.maryland.gov/criticalarea/Documents/Coastal_Resilience_Planning_Guide.pdf.
[78] *Id*.
[79] *See* 9 VA. ADMIN. CODE § 25-830-140(6) (2013).

implement such projects. However, such a general exception may be difficult to achieve, since DEQ emphasizes that each special exception decision is made through a specific, site-by-site analysis.[80]

III. The Impact of Stormwater Management Requirements on Flood Resiliency

Another tension between water quality protection and flood resilience can occur when implementing Virginia stormwater management requirements at the local level. Strict stormwater regulations are designed to protect the quality of water by limiting harmful runoff. However, compliance with these regulations at some sites can result in actions that are detrimental to flood resilience. This section will focus on two types of physical constraints to stormwater management that can frustrate flood mitigation efforts: a seasonal high groundwater table and a large amount of impervious cover at a site.

A. Virginia Stormwater Management Requirements

Unmanaged stormwater can carry contaminants, nutrients, and sediment, which are then deposited in Virginia waters.[81] It can also cause erosion and flooding.[82] For these reasons, the Commonwealth has developed extensive laws and regulations designed to manage stormwater runoff.

The DEQ is authorized to implement and oversee Virginia laws relating to water quality. This includes the Virginia Stormwater Management Act, which will become the Virginia Erosion and Stormwater Management Act (VESMA) once the necessary consolidated regulations are adopted.[83] This statute requires a stormwater permit for any "land-disturbing activity,"[84] which is defined as any "man-made change to the land surface that potentially changes its runoff characteristics including clearing, grading, or excavation."[85] The stormwater management regulations are organized around two main types of technical criteria: water quality and water quantity, including flood control. The stormwater program is meant to "manage the quality and quantity of stormwater runoff resulting from any land-disturbing activity that (i) disturbs one acre or more of land or (ii) disturbs less than one acre of land and is part of a larger common plan of development or sale that results in one acre or greater of land disturbance."[86] In areas of localities designated as Chesapeake Bay Preservation Areas, land disturbances of just 2,500 square feet or more are regulated under the stormwater management regulations.[87] The water quality technical

[80] Telephone Interview with Dept. of Envtl. Quality, Chesapeake Bay Pres. Act Program Staff (April 3, 2019).
[81] *See Stormwater Management*, VA DEPT. OF ENVTL. QUALITY, https://www.deq.virginia.gov/Programs/Water/StormwaterManagement.aspx (last visited Feb. 6, 2019).
[82] *See id.*
[83] VA. CODE ANN. § 62.1-44.15:27 (2018) (combining the Virginia Erosion and Sediment Control Program and the Virginia Stormwater Management Program); *see* H.B. 1250 Reg. Sess. (Va. 2016).
[84] VA. CODE ANN. § 62.1-44.15:27.1(A) (2018).
[85] *Id.* § 62.1-44.15:24 (2018).
[86] *Id.* § 62.1-44.15:27.1(A)(1) (2016).
[87] *Id.* § 62.1-44.15:27 (2018).

criteria, which aim to both protect the quality of water and control the discharge of stormwater pollutants, set minimum design criteria and standards.[88]

The water quantity technical criteria contain a channel protection element as well as a flood protection element.[89] Under the channel protection requirements, stormwater flow must be released into one of three possible types of conveyance systems: manmade, restored, or natural.[90] Each of these systems requires a specific runoff volume to be attained. For example, for natural stormwater conveyance systems, the regulations establish the maximum peak flow rate that must be achieved post-development.[91] This rate is calculated using a formula called the Energy Balance Equation; the equation is designed to balance the pre-development stormwater volume with the post-development stormwater volume, which ensures protection of existing channel conditions.[92]

The overall aim of the stormwater management regulations is to reduce the total runoff load leaving a new development site. Achieving this load reduction can be difficult, particularly when an area is heavily developed, a site has a high groundwater table, or there is a significant amount of impervious cover. Several best management practices (BMPs) have been identified, developed, and approved by the state for use in stormwater management, such as grass channels, green roofs, retention ponds, and infiltration systems. However, as discussed below, environmental constraints in many Virginia localities make some stormwater BMPs less effective or not feasible.

B. Environmental Constraints on Local Stormwater Management

This section will discuss two types of site characteristics that can impact stormwater management and flood resilience: a seasonal high groundwater table and the amount of impervious cover in an area. These characteristics can make it more difficult for developers to use certain stormwater BMPs, which can then result in development activity that negatively impacts a site's flooding resilience.

Certain regions of Virginia have a seasonal high groundwater table (SHGT), which can complicate stormwater management and make some BMPs less effective. In 2015, the Virginia General Assembly requested that DEQ "study the application of the postdevelopment stormwater management technical criteria . . . in areas with a seasonal high groundwater table."[93] In response, DEQ provided two reports in 2015 and 2016 addressing the General Assembly's inquiry. The 2015 report defines SHGT as "the shallowest depth to free water that stands in an unlined borehole or

[88] 9 VA. ADMIN. CODE § 25-870-63(A) (2013).
[89] *See id.* § 25-870-66 (2018).
[90] *See id.* § 25-870-66(B) (2018).
[91] *Id.* § 25-870-66(B)(3) (2018).
[92] *Id.* § 25-870-66 (2018); *see* VA DEPT. OF ENVTL. QUALITY, APPLICATION OF THE POSTDEVELOPMENT STORMWATER MANAGEMENT TECHNICAL CRITERIA, AS ESTABLISHED IN THE VIRGINIA STORMWATER MANAGEMENT PROGRAM REGULATIONS, IN AREAS WITH A SEASONAL HIGH GROUNDWATER TABLE 3 (2015), https://rga.lis.virginia.gov/Published/2016/HD2/PDF [hereinafter SHGT Report 1].
[93] H.J. Res. 587 Reg. Sess. (Va. 2015); *see* Nick Bradford, *Groundwater and the Rising Seas*, NAT. ENVTL. EDUC. FOUND., https://www.neefusa.org/nature/water/groundwater-and-rising-seas (last visited June 17, 2019).

where the soil moisture tension is zero for a significant period (more than a few weeks)."[94] This depth determines which stormwater BMPs can be used effectively in the area. For example, the second report states that "[i]nfiltration practices may not function as intended in areas with a SHGT,"[95] because it is necessary to maintain a sufficient distance between the bottom of a BMP and the SHGT.[96] A physical constraint like an SHGT may reduce infiltration and compromise the volume reduction capability of a BMP.[97] The two reports analyze the feasibility of a number of infiltration BMPs in areas with an SHGT, such as permeable pavement and bio-retention, and conclude that many of these practices can be less effective in such areas. [98]

In addition, a large amount of impervious cover in an area can be a physical constraint on stormwater management options. Impervious cover is any land surface that "significantly impedes or prevents natural infiltration of water into the soil,"[99] and can include roofs, streets, parking lots, and buildings. In 2012 and 2013, the Hampton Roads Planning District Commission issued reports about the ability of Hampton Roads localities to use stormwater management BMPs.[100] Phase 1 of the report found that many of these localities have significant amounts of impervious cover,[101] which can cause stormwater runoff volume and peak flow to increase.[102] Thus, localities with a large amount of impervious cover have the difficult task of finding stormwater BMPs that can efficiently and sufficiently reduce the total phosphorus load in stormwater runoff. The reports offer a number of policy suggestions to address the impacts of stormwater on water quality, such as capping the amount of impervious surface on a lot based on density and zoning, and policies to prevent undesired trimming or clearing of vegetation BMPs.[103]

C. Negative Consequences for Flood Resiliency

As noted above, some of the most common and efficient BMPs do not work as effectually in areas with an SHGT or significant amounts of impervious cover.[104] Because localities with an SHGT or high levels of impervious cover are limited in which stormwater BMPs they can utilize effectively, developers may turn to altering development sites in a way that negatively impacts

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[94] SHGT Report 1, *supra* note 92 (citing *Virginia DEQ Stormwater Specification No. 8: Infiltration Practices*, VA DEPT. OF ENVTL. QUALITY (Jan. 2013), https://www.swbmp.vwrrc.vt.edu/wp-content/uploads/2017/11/BMP-Spec-No-8_INFILTRATION_v1-9_03012011.pdf).

[95] VA DEPT. OF ENVTL. QUALITY, APPLICATION OF THE POSTDEVELOPMENT STORMWATER MANAGEMENT TECHNICAL CRITERIA, AS ESTABLISHED IN THE VIRGINIA STORMWATER MANAGEMENT PROGRAM REGULATIONS, IN AREAS WITH A SEASONAL HIGH GROUNDWATER TABLE 7 (2016), https://rga.lis.virginia.gov/Published/2016/HD15/PDF [hereinafter SHGT REPORT 2].

[96] *Id.* at 8.

[97] *Id.* at 7.

[98] SHGT REPORT 1, *supra* note 92, at 7; SHGT REPORT 2, *supra* note 95, at 13.

[99] 9 VA. ADMIN. CODE § 25-830-40 (2015).

[100] *See* SARA J. KIDD ET AL., LAND AND WATER QUALITY PROTECTION IN HAMPTON ROADS, PHASE 1 (2012), https://www.hrpdcva.gov/uploads/docs/HRPDCAgendas/2013/March/Website/03212013-PDC-E8G.pdf [hereinafter HAMPTON ROADS REPORT 1]; SARA J. KIDD ET AL., LAND AND WATER QUALITY PROTECTION IN HAMPTON ROADS, PHASE 2 (2013), https://www.hrpdcva.gov/uploads/docs/11212013-PDC-E3A.pdf [hereinafter HAMPTON ROADS REPORT 2].

[101] *See* HAMPTON ROADS REPORT 1, *supra* note 100, at 6.

[102] *See id.* at 17; SHGT REPORT 1, *supra* note 92, at 2.

[103] *See* HAMPTON ROADS REPORT 1, *supra* note 100, at 25-29.

[104] *See* SHGT Report 1, *supra* note 92, at 8.

flooding resiliency, by removing trees and grading sites to create topography that will retain stormwater onsite.

For example, there have been concerns surrounding a new development in the Eclipse community of Suffolk, Virginia because of clearing of trees on the development site. The Suffolk Director of Planning and Community Development, David Hainley, confirmed in a news article that the tree clearings noticed by residents were being done to comply with drainage requirements.[105] Removing trees and other vegetation from a development site can significantly impact a site's flooding resiliency by reducing its ability to withstand storm surges and heavy rain.

When developers grade sites to comply with VSMP regulations, resulting in tree removal and thus less flood buffering, this effort to improve water quality through stormwater management practices can decrease a site's flood resiliency. If on-site retention is required by the Energy Balance Equation,[106]that may compel a developer to use BMPs other than retention ponds when there is a high groundwater table, to clear trees to create a grade to enable retention in flat low lying areas, or to use more land to achieve retention on site.

In addition, the Energy Balance Equation used in the stormwater management regulations is based on the volume of stormwater coming off of a site under today's conditions, and the regulation's flood protection measures look at localized flooding that is currently being experienced.[107] As climate change impacts are felt, including increasing storm intensity and frequency and rising sea level,[108] and the water table subsequently rises, these existing measures may no longer be adequate – which could result in increased flooding from stormwater runoff. For example, the City of Virginia Beach hired the firm Dewberry to do an analysis of rainfall frequency and intensity.[109] Having found that precipitation has increased over the past 70 years, the city changed its stormwater design manual.[110] Other Virginia localities, or the Commonwealth as a whole, may need to consider similar changes.

D. Facilitating Stormwater Management Without Harming Local Resiliency

While it is not impossible for localities with an SHGT or significant impervious cover to comply with stormwater management requirements, the presence of these land conditions can limit which stormwater BMPs a locality can employ effectively and may restrict flood resiliency efforts. This creates a tension for localities that need to comply with stormwater management regulations, but also want to mitigate the effects of recurrent flooding. Because of these practical challenges, Virginia may need to consider updating or revising how it manages stormwater.

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[105] *See* Alex Perry, *Eclipse Development Sparks Backlash*, SUFFOLK NEWS HERALD (Aug. 23, 2018), https://www.suffolknewsherald.com/2018/08/23/eclipse-development-sparks-backlash/.
[106] *See* 9 VA. ADMIN. CODE § 25-870-66 (2018).
[107] *See id.* § 25-870-66 (2018).
[108] *See* MOLLY MITCHELL ET AL., RECURRENT FLOODING STUDY FOR TIDEWATER VIRGINIA (2013), http://ccrm.vims.edu/recurrent_flooding/Recurrent_Flooding_Study_web.pdf.
[109] *See* DEWBERRY, ANALYSIS OF HISTORICAL AND FUTURE HEAVY PRECIPITATION (2018), https://www.vbgov.com/government/departments/public-works/comp-sea-level-rise/Documents/anaylsis-hist-and-future-hvy-precip-4-2-18.pdf (created for the City of Virginia Beach).
[110] *See id.*

Other states recognize physical development constraints in their stormwater regulations. For example, Minnesota's stormwater management program recognizes that it is sometimes impossible to decrease the amount of stormwater runoff leaving a development site.[111] The state has established three alternative treatment options (feasible treatment options, or FTOs) for sites unable to meet the regulation's standard performance goals:[112]

- "FTO 1: Achieve at least 0.55 inch volume reduction and remove 75 percent of the annual TP [Total Phosphorus] load.
- FTO 2: Achieve volume reduction to the maximum extent practicable (determined by local authority) and remove 60 percent of the annual TP load.
- FTO 3: Off-site mitigation can be used."[113]

Minnesota uses a multistep flowchart based on data obtained from an on-site review that, among other things, includes a soil survey, photos, and borings to determine which FTOs a site can use.[114] They also have a comprehensive online stormwater manual with tools, links, regulations, and concepts available to localities, regulators, and the general public.[115]

Maryland's stormwater management program makes allowances for geographical differences and specific site designs, establishes discrete rainfall depth zones, and makes adjustments based on hydrography and unique land features. The Maryland Environmental Code states that stormwater rules and regulations "shall . . . make allowance for the difference in hydrologic characteristics and stormwater needs of different parts of the state,"[116] creating a built-in flexibility for localities to tailor their stormwater practices to the needs of their area. [117]

Virginia has some level of flexibility in its stormwater regulations such as the ability to modify certain aspects of BMPs[118] and other compliance options such as allowing rural localities within the Tidewater region to adopt a tiered approach to water quality control "based on the percentage of impervious cover in the watershed."[119] Virginia also allows VSMP authorities to use

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[111] *See* SHGT REPORT 1, *supra* note 92, at 9 (showing examples of the "differences among the state approaches, from which DEQ can gain valuable insights"); *see also* Minn. Pollution Control Agency, *Performance goals for new development, re-development and linear projects*, MINN. STORMWATER MANUAL, https://stormwater.pca.state.mn.us/index.php/Performance_goals_for_new_development,_re-development_and_linear_projects (last modified Nov. 6 2014, 4:45 PM).
[112] *Id*.
[113] *Id*.
[114] Minn. Pollution Control Agency, *MIDS Design Sequence Flow Chart*, MINN. STORMWATER MANUAL https://stormwater.pca.state.mn.us/images/8/89/Final_MIDS_Flow_chart.pdf (last visited June 24, 2019).
[115] Minn. Pollution Control Agency, *Minn. Stormwater Manual*, MINN. STORMWATER MANUAL https://stormwater.pca.state.mn.us/index.php?title=Main_Page (last modified June 18, 2019, at 13:22).
[116] MD. ENV. CODE § 4-203(b)(2) (2013).
[117] *Id*.; *see* SHGT REPORT 1, *supra* note 92, at 10; *see also*, *Stormwater Management and Improving Water Quality in the Critical Area*, MD. DEPT. OF NAT. RES., http://dnr.maryland.gov/criticalarea/Pages/stormwater.aspx (last visited June 17, 2019).
[118] SHGT REPORT 1, *supra* note 92, at 12 (flexible options include design modifications such as vertical groundwater separation distance reduction or off-site compliance options).
[119] VA. CODE ANN. § 62.1-44.15:27.2 (2018).

the Stormwater Management Act as a baseline and adopt more stringent requirements.[120] However, Virginia could look to the programs of other states, such as programs that take into account regional differences in hydrology, to incorporate more flexibility into its stormwater management program.

The Commonwealth also could update its existing stormwater management regulations to better reflect current flooding conditions. For example, the regulations could incorporate a predictive range of precipitation data into the calculations determining which stormwater BMPs will be used at a site. In an interview, Ben McFarlane, the senior regional planner for the Hampton Roads Planning District Commission, emphasized the need to revise existing stormwater management laws in a way that incorporates more recent data and future projections.[121] Under the current stormwater regulations, the runoff requirements are informed by the rainfall precipitation frequency data from the National Oceanic and Atmospheric Administration (NOAA) Atlas 14.[122] The last update of NOAA Atlas 14 for Virginia occurred in 2006.[123] In discussing stormwater BMPs, McFarlane noted, "There's a lot of data from the last twenty years that is not being factored into the design of these structures."[124] The stormwater standards should be updated to incorporate recent data and allow for localities to be flexible and proactive moving forward. As McFarlane said, localities "need to be able to factor in the uncertainty" when constructing stormwater and resiliency structures.[125]

Perhaps a stakeholders group could be established to decide the best way to address these issues. A similar approach was taken in 2017 in response to Virginia House Bill 1774 (2017).[126] A workgroup was established to consider potential solutions for rural localities struggling to comply with complex stormwater management requirements due to funding and other resource constraints. A new workgroup, focused on balancing resiliency with stormwater management and water quality protection when possible, could identify the areas needing reconsideration in the stormwater regulations and recommend potential solutions.

IV. Conclusion

Given the increasing threat of recurrent flooding, Virginia needs to reconsider how it balances water quality priorities and flood resiliency initiatives. Current water quality regulations, particularly under the Chesapeake Bay Preservation Act and the Stormwater Management Act, can affect resiliency measures in coastal communities. This can conflict with both federal and local

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[120] *Id*. § 62.1-44.15:33 (2014).
[121] Telephone Interview with Ben McFarlane, Senior Reg'l Planner, Hampton Rd. Planning Dist. Comm'n (March 15, 2019).
[122] *See* 9 VA. ADMIN. CODE §§ 25-870-72 (2013); 25-870-160 (2018).
[123] *See* GEOFFREY M. BONNIN, ET AL., NOAA ATLAS 14: PRECIPITATION-FREQUENCY ATLAS OF THE UNITED STATES (2004, rev. 2006), https://www.nws.noaa.gov/oh/hdsc/PF_documents/Atlas14_Volume2.pdf.
[124] McFarlane, *supra* note 121.
[125] *Id*.
[126] *See* COMMONWEALTH CTR. FOR RECURRENT FLOODING RESILIENCY, RD 540, REPORT TO THE GOVERNOR AND THE CHAIRMEN OF THE HOUSE COMMITTEE ON AGRICULTURE, CHESAPEAKE AND NATURAL RESOURCES AND THE SENATE COMMITTEE ON AGRICULTURE, CONSERVATION AND NATURAL RESOURCES, PURSUANT TO HOUSE BILL 1774 (2017), https://rga.lis.virginia.gov/Published/2017/RD540.

priorities regarding flood mitigation, and this tension between water quality protection and flood mitigation can exist at all levels.

Stakeholder workgroups could be formed to identify changes in the laws and regulations that would provide a better balance between these issues in Virginia. Revising and clarifying current water quality legislation to allow for more flexibility for localities making decisions concerning resilience measures may help reconcile conflicts, at least at the local level. Regardless of the chosen path forward, it is clear that Virginia must consider both water quality protection and flood resiliency in order to effectively address the water challenges facing the state.