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Adaptive Planning for Flooding and Coastal Change in Virginia: State and Local Areas of Action

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About the Authors

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Erica Penn, J.D. forthcoming, is a third-year student at William & Mary Law School and a member of the Virginia Coastal Policy Clinic. Ms. Penn is the current Environmental Law and Policy Review (ELPR) Symposium Chair 2013-14, and served as Assistant Symposium Chair the prior year. She was a Virginia Sea Grant Summer Fellow. She represents the law school as a Senator in the William & Mary Student Assembly. In addition, she served as 2L Class Representative in the Student Bar Association and Chair of the Black Law Student Association's Undergraduate Outreach Committee. She graduated cum laude from the University of Florida in 2011 with a Bachelor of Arts in Political Science, and two minors in Business Administration and Organizational Leadership for Non-profits.

About the Virginia Coastal Policy Clinic

The Virginia Coastal Policy Clinic (VCPC) at William & Mary Law School provides science-based legal and policy analysis of environmental and land use issues affecting the state's coastal resources and educates the Virginia policy making, non-profit, legal and business communities about these subjects.

Working in partnership with Virginia scientists, law students in the clinic integrate the latest science with legal and policy analysis to solve coastal resource management issues. Examining issues ranging from property rights to federalism, the clinic's activities are inherently interdisciplinary, drawing on scientific, economic, and policy expertise from across the university. VCPC has a strong partnership with the Virginia Institute of Marine Science (VIMS) and Virginia Sea Grant.

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

A Note from the VCPC Director

Adapting to flooding and sea level rise is a complex area. We have not identified all of the possible legal or policy issues that may arise. We hope, however, that our white papers begin to answer some of the threshold questions facing Virginia localities at this time. We also anticipate that they lay the groundwork for in-depth work and identify areas of needed discussion and additional research. We therefore welcome any feedback on our work. Please contact Shana Jones at scjones@wm.edu if you have any questions or comments.

Recurrent Flooding: List of Primary Virginia Agencies	ACRONYM	seen on page
Virginia Marine Resources Commission	VMRC	3, 4, 7, 8, 10, 12, 15
Department of Environmental Quality	DEQ	3, 7, 8, 12, 15
Department of Conservation and Recreation	DCR	3, 7, 8, 9, 10, 11, 15
Department of Housing and Community Development	DHCD	10, 11, 12
Virginia Department of Emergency Management	VDEM	3, 13, 14, 15
Virginia Department of Transportation	VDOT	4, 13, 14, 15
Virginia Port Authority	VPA	13
Department of Health	VDH	7, 10, 12
Department of Forestry	VDOF	7, 9

Introduction

Recurrent coastal flooding poses a considerable threat to life and property in Virginia. By 2050, the sea level in the region is expected to rise at least 1.5 feet leading to an increase in the frequency and intensity of recurrent coastal flooding for the Secure Commonwealth Panel.¹ These storms have the potential to impose significant health, safety, infrastructure and property costs upon government and private actors.

This paper is designed to assist the Secure Commonwealth Panel's Sub-Panel on Recurrent Flooding as they formulate recommendations for a coordinated and efficient strategy to respond to the increasing risks from recurrent flooding. It is designed to assist the Sub-Panel with determining what adaptation measures are possible without changing existing law. It is also designed to identify potential gaps, which would point to areas where additional legislation may be needed to adequately respond—as well as what agency can most efficiently implement that legislation.

This paper presents several conclusions, some of which will need future exploration:

- **Increase State Agency Coordination.** Given that nine state agencies are authorized or required to act in significant areas that impact recurrent flooding response and adaptation policy, stronger coordination among each of these agencies should be evaluated and considered.
- **Exercise Existing Legal and Policy Tools Fully and Effectively.** The Secretary of Natural Resources oversees the three agencies—VMRC, DEQ, and DCR—that implement or oversee the majority of existing coastal and shoreline protection practices that could serve as adaptation strategies designed to reduce vulnerability to the consequences of recurrent flooding. Most of these practices have an environmental protection focus; however, strong implementation and enforcement of these laws and policies could have benefits for flood control and adaptation. Stronger coordination with DCR's Floodplain Management Program and the Virginia Department of Emergency Management (VDEM) also may be useful, given their focus on flooding preparedness.
- **Provide resource and technical support for local governments who are delegated significant authority to implement wetlands, coastal, and shoreline protection**

laws and stormwater management laws. Under delegated authority from VMRC, for example, most local governments administer and enforce the permitting processes involving tidal wetlands, shorelines, and dunes. Similarly, local governments administer the Chesapeake Bay Preservation Act and manage stormwater programs. Because strong implementation and enforcement of these laws and policies could have benefits for flood control and adaptation, more resources and technical support for local governments shouldering these responsibilities should be considered.

- **Provide resource and technical support for local governments who, under their zoning powers, flood control powers, and local road construction responsibilities, will be on the forefront of adopting many of the adaptation strategies necessary to protect human life and property from recurrent flooding.** While a significant amount of authority exists at the state level to being addressing recurrent flooding, many of the necessary measures will be adopted on a local level under a locality's zoning and flood control powers. The stronger and more uniform these measures are, the better prepared Virginia localities will be to limit individual harm or property loss. Local political subdivisions are responsible for county and local roads. Localities could be required to consider project recurrent levels into their comprehensive planning for their long-term infrastructure needs.
- **Consider requiring new and maintained infrastructure built by VDOT to withstand projected increases of recurrent flooding.** Although VDOT acknowledges in its long-range planning that future plans may need to address rising sea levels and flood waters, it does not require new infrastructure to be built to withstand projected increases recurrent flooding.

Secure Commonwealth Panel: Sub-Panel on Recurrent Flooding

The Secure Commonwealth Panel was created by statute in 2011, and is an advisory board that reports directly to the Governor of Virginia.³ Its 34 person membership is diverse, including several upper level cabinet members, elected officials, local government representatives and community leaders. The Panel shall:

1. [M]onitor and assess the implementation of statewide prevention, preparedness, response, and recovery initiatives and where necessary to review, evaluate, and make recommendations relating to the emergency preparedness of government at all levels in the Commonwealth; and
2. [F]acilitate cabinet-level coordination among the various agencies of state government related to emergency preparedness and shall facilitate private sector preparedness and communication.⁴

In response to a Virginia Institute of Marine Science (VIMS) report elaborating the looming impacts of recurrent coastal flooding⁵, the Panel has initiated the Sub-Panel on Recurrent Flooding. The goal of the Sub-Panel is to establish a comprehensive strategy to manage these risks.

Agency Authority and Responsibilities

To assist the Sub-Panel with its work, this paper provides a brief overview of the roles that various state agencies play with respect to recurrent flooding. In some cases, the named agency is required to act, in others, this report points to areas which an agency has discretionary authority to respond to flooding.

We have organized the section into four main categories of interest to a comprehensive recurrent flooding strategy:

- Coastal Land Management
- Floodplain Management
- Infrastructure Development and Management
- Emergency Management

Within each category we have provided an overview of the relevant agencies with potential power to act. In certain contexts, agency authority within these categories may overlap with other agencies and categories. Further, this section is not a comprehensive review of every state agency's authority for every possible response to recurrent flooding. We also observe that Planning District Commissions, discussed briefly in this document, will play a large role in assisting localities with adopting and implementing effective adaptation strategies.

The following chart illustrates the major findings from our review of state agency authority and programs:

Flooding and Adaptation in Virginia: Agency Authority and Responsibilities

		Coastal Land Management	Floodplain Management	Infrastructure	Emergency Management
Secretary of Natural Resources	V M R C	Implements the Coastal Primary Sand Dune Protection Act and the Virginia Wetlands Act. Regulates associated permitting processes for sand dunes, beaches and nontidal wetlands. Manages the Commonwealth's "subaqueous" lands; requires a permitting process for activities encroaching subaqueous lands, unless a statutory exemption applies.	N/A	N/A	N/A
	D E Q	Implements the Chesapeake Bay Preservation Act, the Virginia Erosion and Sediment Control Law, the Stormwater Management Act, the Virginia Water Resources and Wetlands Protection Act and the Virginia Coastal Zone Management Program.	Implements the Virginia Waste Management Board's rules and regulations regarding the siting of landfills, which are prohibited in wetlands and 100-year floodplains.	Implements the Stormwater Management Act.	N/A
	D C R	Coordinates efforts on the federal and state level to prevent shoreline erosion through its Shoreline Erosion Advisory Service (SEAS).	Administers Virginia's Floodplain Management Program and Flood Prevention and Protection Fund; and manages Virginia's Open-Space Land Act.	N/A	N/A
Secretary of Public Safety	V D E M	N/A	N/A	N/A	Coordinates, administers and provides guidance to disaster mitigation, preparedness, response, and recovery programs at the federal, state, and local government level.
Secretary of Health and Human Resources	V D H	N/A	Carries out the policies and procedures created by the Board of Housing and Community Development, including the Uniform Statewide Building Code.	N/A	N/A
Secretary of Trans.	V D O T	N/A	N/A	Engineers state drainage and road infrastructure to withstand 100-year storm events.	Responsible for building, maintaining, and operating the state's roads, bridges and tunnels in the event of a flooding disaster. Also prepares Virginia's Hurricane Evacuation Guide.
	V P A	N/A	N/A	Authority to initiate and further plans for the development of the ports of the Commonwealth. Such plans must consider the present requirements and likely future needs of those ports.	N/A
Secretary of Agriculture and Forestry	D O F	Implements a riparian forest buffer protection for waterways tax credit.	N/A	N/A	N/A

Coastal land management. Wetlands, Dunes, Riparian Buffers

Agency Involvement: VMRC, DEQ, VDOF, VDH, DCR

The Commonwealth is home to many valuable natural resources including its expansive coastline, wetlands and beaches. Unfortunately, these land resources are most vulnerable to the impacts of sea level rise and recurrent flooding due to their proximity to water. In addition, these areas, especially wetlands, dunes and riparian buffers, serve as a natural defense against rising waters. By protecting and cultivating these natural resources, the Commonwealth can respond to sea level rise through natural adaptation measures that would save money and lower environmental impacts. The following state agencies monitor and protect coastal lands:

Virginia Marine Resources Commission (VMRC)

VMRC is the primary agency responsible for preserving and protecting our coastal sand dunes, beaches and tidal wetlands—critical natural defenses to rising waters⁶—by implementing the **Coastal Primary Sand Dune Protection Act**⁷ (the “Dune Act”) and the **Virginia Tidal Wetlands Act**⁸. VMRC also manages the Commonwealth’s “subaqueous” lands,⁹ through a permit process requiring coastal and riparian property owners get approval before encroaching on subaqueous lands by building structures such as docks or piers.¹⁰

VMRC delegates most of its permitting authority to localities. Local governments can choose to adopt statewide model ordinances for wetlands and primary coastal sand dunes (which include beaches).¹¹ Local governments that adopt these statewide model ordinances are required to appoint a local wetlands board that will have authority to administer and enforce both ordinances, including the permitting process.¹² VMRC will administer and enforce the permitting process in localities that do not elect to implement statewide model ordinances and appoint a local wetlands board.¹³

Additionally, the commission, with the assistance of the VIMS, promulgates a set of guidelines for wetlands management and another for primary coastal sand dunes and beaches management.¹⁴ These guidelines attempt to balance economic development and ecological preservation.¹⁵ They are not enforceable and are advisory only.

In 2011, VMRC was charged with establishing a general permit regulation that encouraged the use of living shorelines as a viable measure to stabilize tidal shorelines.¹⁶ The Virginia General Assembly recognized the potential in promoting a “green” adaptation measure for shoreline stabilization. In addition, the General Assembly required VMRC to develop integrated technical guidance for the management of tidal shorelines that inform permitting decisions, including communicating to stakeholders and regulatory authorities that living shorelines are the preferred alternative for stabilizing tidal shorelines.¹⁷

The Department of Environmental Quality (DEQ)

DEQ, under the direction of the State Water Control Board, implements several legislative directives and programs directly related to protecting natural resources that provide flood control and adaptation services, namely: the Chesapeake Bay Preservation Act, the Virginia Erosion and Sediment Control Law, the Stormwater Management Act, the Virginia Water Resources and Wetlands Protection Program and the Virginia Coastal Zone Management Program.

The **Chesapeake Bay Preservation Act** (CPBA) was enacted to improve water quality in the Bay by requiring local governments to adopt more stringent measures controlling land use. As such, it includes several requirements that serve to protect coastal lands and wetlands that help mitigate flooding. The Act requires the State Water Control Board to create criteria designating what lands are within Chesapeake Bay Preservation Areas.¹⁸ Lands within the preservation areas are subject to special regulations, created by the State Water Control Board, that establish the criteria local government should use when making decisions to rezone, subdivide, use or develop the land.¹⁹ In many cases, land designated as a Chesapeake Bay Preservation Area is coastal land or considered wetlands. In this way, the DEQ, through the State Water Control Board, has authority to protect coastal lands and wetlands that provide flood-control services when these lands fall within the CPBA's jurisdiction.

The **Virginia Erosion and Sediment Control Law**²⁰ creates a program to improve the states' water quality by providing for effective control of sediment, soil erosion, and nonagricultural runoff. In July 2013, DEQ took over the implementation of the program, from DCR.²¹ Under this change the State Water Control Board, not the Soil and Water Conservation Board, will develop regulations to improve water quality.²² These regulations do not apply to shorelines under the jurisdiction of VMRC; however, this program does apply to "associated land that is disturbed."²³ Therefore the DEQ, through the State Water Control Board, has regulatory jurisdiction over land adjacent to shorelines and wetlands that suffers from soil erosion, sediment deposition and/or nonagricultural runoff.

The **Stormwater Management Act**²⁴ is administered by the DEQ at the behest of the State Water Control Board, to improve water quality standards by regulating runoff pollution from nonpoint sources.²⁵ Under the Act, the DEQ can issue and enforce state permits for municipal separate sewer discharge and other activities that disturb the land.²⁶ The State Water Control Board is authorized to promulgate stormwater regulations to protect the health, safety, and welfare of citizens of the Commonwealth.²⁷ Many Virginia Stormwater Management Programs are managed by localities. Controlling stormwater could have significant flood protection benefits for Virginia citizens.

The **Virginia Water Resources and Wetlands Protection Act** was enacted to protect the state's wetlands. It requires individuals to obtain a permit before commencing any activity that would have an impact on nontidal wetlands.²⁸ The permit requirements are based on provisions in **Virginia State Water Control Law** and the **Clean Water Act**.²⁹ The State Water Control Board is responsible for approving or denying permits.³⁰ A permit can be approved only if "the effect of the impact, together with other existing or proposed impacts to wetlands, will not cause or contribute to a significant impairment of state waters or fish and wildlife resources."³¹ Permits also contain requirements for compensating the impacts on wetlands, which the board can use when determining whether to approve or deny a permit.³³ By preserving wetlands, DEQ has the authority to increase the number of natural flood adaptation measures.

Virginia's Coastal Zone Management Program was established in 1986 under the federal Coastal Zone Management Act in order to protect coastal resources and promote sustainable development.³³ It is a federally approved partnership between the state, National Oceanic and Atmospheric Administration (NOAA), and other states.³⁴ DEQ is the lead state agency coordinating the program.³⁵ The

2010 Executive Order by Governor Robert McDonnell continuing the program specified that the following state agencies are responsible for implementing and enforcing its policies pertaining to specific coastal management zones:³⁶

State Agencies Responsible for Implementing Policies Under the Federal Coastal Zone Management Act

Agency	Implementation and Enforcement of Coastal Management Zone Policies
Department of Environmental Quality	<ul style="list-style-type: none"> • Nontidal wetlands management • Point source water pollution management • Air Pollution
Department of Conservation and Recreation	<ul style="list-style-type: none"> • Nonpoint source pollution management • Coastal lands management
Virginia Marine Resources Commission	<ul style="list-style-type: none"> • Primary sand dunes management • Tidal wetlands management • Subaqueous lands management • Fisheries management
Department of Game and Inland Fisheries	<ul style="list-style-type: none"> • Fisheries management
Department of Health	<ul style="list-style-type: none"> • Shoreline sanitation
Department of Agriculture and Consumer Services Department of Forestry Department of Historic Resources Department of Mines, Minerals & Energy Department of Transportation Virginia Economic Development Partnership Virginia Institute of Marine Science	<ul style="list-style-type: none"> • Responsible for assisting with program

Eight coastal Planning District Commissions (PDCs) serve as Coastal Planning District Commissions as part of the Coastal Zone Management Program and provide technical and resource support to localities.

The Department of Conservation and Recreation (DCR)

DCR is tasked with protecting and restoring natural resources for citizen's enjoyment.³⁷ With respect to coastal land management, DCR is primarily concerned with preserving beaches for recreational purposes. The agency also plays a key role in coordinating efforts on the federal and state level to prevent shoreline erosion.³⁸ Their **Shoreline Erosion Advisory Service** (SEAS) provides technical assistance to private, local, state and federal property owners, and regulatory agencies.³⁹ In their capacity as coordinator, DCR is also tasked with evaluating the effectiveness and practicality of current shore erosion control programs and suggesting viable alternatives.⁴⁰

The Department of Forestry (VDOF)

VDOF is primarily responsible for protecting and developing healthy, sustainable forest resources.⁴¹ In order to accomplish this goal, the agency implements a riparian

forest buffer protection for waterways tax credit.⁴² Riparian forests are wooded buffer zones along streams, rivers, and the Bay.”⁴³ To qualify for the tax credit, landowners planing to timber their property must maintain a riparian forest buffer between 35 and 300 feet from the waterway.⁴⁴ Riparian forest buffers contain “trees and other vegetation that are able to slow and absorb flood waters” and reduce downstream flooding in more populated areas.⁴⁵

The Department of Health (VDH)

VDH, under the direction of the State Board of Health,⁴⁶ is responsible for shoreline sanitation.⁴⁷ The State Board of Health may order the closing of any stream, lake or river in Virginia if the water body presents a threat to public health and safety.⁴⁸ The board has broad statutory authority to close a water body to any use, not just recreational.⁴⁹ Maintaining healthy coastal waters, wetlands and shoreline promote expansion of natural adaptation measures. eas. In addition, floodwaters may be contaminated and/or contaminate Virginia waterbodies, requiring VDH action.

Floodplain Management

Agency Involvement: DCR, DHCD, HRPDC, VDH

Managing building and development in flood-prone areas is a critical component of any response to recurrent flooding. Indeed, localities can require structures to be designed in a manner that limits damage from flood events. Such building codes are already being adopted in localities that wish to participate in the National Flood Insurance Program.

Further, it is important to carefully manage other uses in areas subject to recurrent flooding. This can be done through zoning and other regulatory powers. Managing floodplain activity can limit property loss, pollution, or other harm to individuals that may result from a flood event.

Virginia Marine Resources Commission (VMRC)

DCR administers two programs that relate to managing development in flood-prone areas. The first, **Virginia’s Floodplain Management Program**,⁵⁰ is directly related to floodplain management. DCR also manages the Virginia **Open-Space Land Act**, which allows a government actor to limit construction upon a parcel of land and preserve it for conservation of recreation or conservation purposes⁵¹—a program that could result in the conservation of flood-prone land.

Under the **Floodplain Management Program**, DCR is responsible for coordinating with FEMA, other federal agencies,⁵² and various state agencies to implement the Commonwealth’s flood protection and prevention program.⁵³ DCR also provides a support role to local governments with areas situated on floodplains. It must make flood and flood damage reduction data available to localities,⁵⁴ as well as create floodplain guidelines that meet the minimum requirements of the **National Flood Insurance Program (NFIP)**.⁵⁵ Such guidelines contain a model floodplain ordinance that localities can adopt wholesale or adapt to create more stringent restrictions on floodplain use. After adopting the floodplain ordinance, localities are responsible for permitting construction activities in floodplains in order to maintain NFIP eligibility.

Further, the DCR director—with the approval of the Soil and Water Conservation

Board—administers the Flood Prevention and Protection Fund.⁵⁶ The Fund provides localities with a 50 percent match of monies for approved flood protection projects.

The Program also provides a broad grant of power to DCR and local governments to implement measures that limit flooding damage in floodplains. The Commonwealth has asserted its strong interest in flood control. Specifically, the General Assembly declared that it “supports and encourages those measures which prevent, mitigate and alleviate the effects of stormwater surges and flooding,” as well as stating that the “expenditure of public funds and any obligations incurred in the development of flood control and other civil works projects, the benefits of which may accrue to any county, municipality or region in the Commonwealth, are necessary expenses of local and state government.”⁵⁷

Although this appears to grant localities a broad authority to adapt to recurrent flooding, the Dillon Rule analysis that is necessary to fully assess local authority is discussed in a separate document.

DCR also aids in the administration of the **Open-Space Land Act**.⁵⁸ The agency provides information and support to local governments to help them conserve land for recreation or conservation purposes. As part of its local floodplain management plan, a municipality may seek to acquire development rights from property within a floodplain under this Act.⁵⁹ By limiting development on a floodplain, a locality will consequently reduce the potential for property destruction in that same area.

Department of Housing and Community Development (DHCD)

The DHCD works with localities to make sure new and existing buildings are safe and up to code. Building codes that require buildings in flood plains to meet certain standards can reduce property damage from floods.

The Department carries out the policies and procedures created by the Board of Housing and Community Development.⁶⁰ The Board creates the **Uniform Statewide Building Code (USBC)** with which all newly-built commercial and residential structures in the state must comply.⁶¹ In most situations, the USBC supersedes all local attempts to implement unique building codes.

However, in the context of floodplain management, the USBC cannot supersede local floodplain ordinances adopted as a condition of participation in the NFIP.⁶² Indeed, a locality can implement floodplain building code restrictions that are more stringent than the USBC, as long as those restrictions are aimed to help increase the locality’s CRS rating according to the NFIP.⁶³

The USBC only applies to new buildings or additions to buildings. Existing structures are grandfathered—they are not required to conform with the Code. By extension, any local building codes adopted as a condition of participation in the NFIP would only apply prospectively to new construction. An important exception to this grandfathering provision applies, however: if a structure located in a floodplain is destroyed and rebuilt the new structure must comply with the USBC and/or more stringent local floodplain building codes.⁶⁴ This requirement persists despite any vested right that the landowner may have to rebuild a nonconforming use in conflict with applicable zoning ordinances.⁶⁵

Planning District Commissions (PDC)

Planning District Commissions, formed via regional partnerships, provide informational and coordination support to their respective constituent localities. The various regional Planning District Commissions are empowered to coordinate state and local actors to respond to regional needs.⁶⁶ The PDCs may implement services at the request of constituent member localities and conduct strategic planning for the region.

The Hampton Roads Planning District Commission, for example, has already studied the regional issues associated with recurrent flooding and continues to engage with the issue. PDCs serve a support role to their constituent localities. Additionally, each of the PDCs on the Virginia coast play an important coordination role in the Virginia Coastal Zone Management Program.⁶⁷

Department of Health (VDH)

The Department of Health administers regulations regarding residential and commercial septic systems adopted by the Board of Health.⁶⁸ Such regulations can help prevent possible water pollution from inundated septic systems.

The Board has limited the use of septic systems in floodplains: subsurface soil absorption septic systems are not allowed in floodplains subject to sustained flooding—inundated for longer than 24 hours—at least once per year.⁶⁹

Virginia Waste Management Board

The Virginia Waste Management Board creates rules and regulations regarding the siting of landfills. Landfills in flood-prone areas may pollute adjacent waterways and lead to disease if inundated. The Board's policies and rules are implemented by DEQ.

The Board creates regulations regarding the siting of new landfills throughout the Commonwealth.⁷⁰ The DEQ Director is in charge of permitting landfill siting and expansion pursuant to the Board's rules.⁷¹ The Board cannot enact regulations that permit new landfills in floodplains or wetlands.⁷² But, the DEQ Director can issue permits to expand existing landfills encroaching upon wetlands if certain conditions are met.⁷³

State Agencies Responsible for Permitting Certain Uses of Land within Floodplains

Agency	Permitting Area	Authority
DEQ	Virginia Water Resources and Wetlands Protection Program	• Control over permitting
	Chesapeake Bay Preservation	• Provides Regulations to local governments
	Landfill Siting	• Control over permitting
VMRC	Tidal Wetlands	• Oversees local implementation
	Sand dunes and beaches	• Oversees local implementation
DHCD	Building Codes	• Provides statewide building codes to be implemented by local entities

Infrastructure Development and Management

Agency Involvement: VDOT, VPA

Infrastructure—roads, water lines, sewers, bridges—constitutes some of the commonwealth's most significant assets. Much of this infrastructure is potentially vulnerable to recurrent flooding. In order to ensure that investments in infrastructure are sound, it is imperative that these public assets remain in working condition for a number of years. Such infrastructure should be engineered to withstand the current and projected risks posed by recurrent flooding.

Virginia Department of Transportation (VDOT)

The Virginia Department of Transportation manages much of the state's roads and associated infrastructure. Any comprehensive response to recurrent flooding should protect state-sponsored infrastructure as well as private property.

VDOT generally engineers state drainage and road infrastructure to withstand 100-year storm events. However, VDOT only acknowledges in its long-range planning that future iterations of the planning document may need to address sea level rise: it does not require new infrastructure to be built to withstand projected increases in sea level rise and associated recurrent flooding.⁷⁴

Although VDOT is not actively planning to adapt infrastructure to withstand rising sea levels, localities may be empowered to do so.⁷⁵ This is important because VDOT is responsible for state roads alone, whereas local political subdivisions are responsible for county and local roads. Localities could factor sea level rise into their comprehensive planning for long-term infrastructure needs: building infrastructure to withstand future recurrent flooding as a result of sea level rise.⁷⁶

Virginia Port Authority (VPA)

The Port of Virginia is vital to the Commonwealth's economy. It is responsible for 343,000 jobs or 9% of the state's resident workforce, \$13.5 billion of employee compensation, and it creates \$41.1 billion in total revenue for the state.⁷⁷

The Port has the authority to initiate and further plans for the development of the ports of the Commonwealth. Such plans must consider the present requirements and likely future needs of those ports.⁷⁸ As such, the Port can consider a rising sea level and recurrent flooding when making decisions regarding future port infrastructure and facilities.

Emergency Response: Disaster response, disaster mitigation/adaptation

Agency Involvement: VDEM, VDOT

Recurrent flooding events pose a real challenge to the Commonwealth due to their frequency, intensity and cost. In order to respond to this challenge, there must be a comprehensive and coordinated emergency response. Currently, there are thousands of Virginians vulnerable to the effects of recurrent flooding and sea level rise, due to their low lying property, or their inability to get to hospitals if surrounding roads are flooded.

This is not just Virginia's problem; it is also a national security problem. The largest naval station in the world is located in Norfolk, a city that is consistently plagued with flooded roadways. The state utilizes agencies such as the Virginia Department of Emergency Management and the Virginia Department of Transportation to respond to flooding and disaster emergencies.

Virginia Department of Emergency Management (VDEM)

VDEM is responsible for preparing and responding to natural disasters. Specifically, VDEM ensures that the Commonwealth has up-to-date assessments and preparedness plans to prevent, respond to and recover from all disasters including acts of terrorism; determines requirements of the Commonwealth and its political subdivisions for those necessities needed in the event of a declared emergency; requests federal assistance; and develops measures to prevent harmful consequences of disasters.⁷⁹ VDEM also has authority to make recommendations to federal, state, and local government agencies on "preventive and preparedness measures designed to eliminate or reduce disasters and their impact."⁸⁰

In its preparation capacity, the agency prepares and maintains a **Statewide Emergency Operations Plan**.⁸¹ This plan "assigns primary and support responsibilities for basic emergency services functions to state agencies, organizations and personnel."⁸² VDEM also prepares a State Hazard Mitigation Plan, pursuant to the federal Disaster Mitigation Act of 2000.⁸³ This plan specifically addresses coastal flood hazards and sea level rise.⁸⁴

VDEM is authorized to coordinate, administer and provide guidance to disaster mitigation, preparedness, response, and recovery programs at the federal, state, and local government level.⁸⁵ Currently, VDEM has statutory authority to lead Virginia's emergency response coordination for recurrent flooding events.

Virginia Department of Transportation (VDOT)

VDOT is responsible for building, maintaining, and operating the state's roads, bridges and tunnels in the event of a flooding disaster.⁸⁶ The Department is allowed to take flood risk into account when constructing roads, bridges, and tunnels; however it is not required to by statute.

VDOT prepared and released the Virginia Hurricane Evaluation Guide in 2013.⁸⁷ This guide instructs the public on proper highway usage in the event of a mass evacuation of Hampton Roads.⁸⁸

VDOT also has the authority to issue permits to local governments that want to close roads subject to inundation by floodwaters retained by a watershed retention structure, such as a stormwater retention pond.⁸⁹

Conclusion

Human life, public safety, natural resources, and private property are at risk because of increased recurrent flooding and sea level rise. As Virginia continues to prepare for increased recurring flooding, our review of the major agencies that impact flood management and policy leads us to conclude that the following findings should be considered and explored:

- **Increase State Agency Coordination.** Given that nine state agencies are authorized or required to act in significant areas that impact recurrent flooding response and adaptation policy, stronger coordination among each of these agencies should be evaluated and considered.
- **Exercise Existing Legal and Policy Tools Fully and Effectively.** The Secretary of Natural Resources oversees the three agencies—VMRC, DEQ, and DCR—that implement or oversee the majority of existing coastal and shoreline protection practices that could serve as adaptation strategies designed to reduce vulnerability to the consequences of recurrent flooding. Most of these practices have an environmental protection focus; however, strong implementation and enforcement of these laws and policies could have benefits for flood control and adaptation. Stronger coordination with DCR's Floodplain Management Program and the Virginia Department of Emergency Management (VDEM) also may be useful, given their focus on flooding preparedness.
- **Provide resource and technical support for local governments who are delegated significant authority to implement wetlands, coastal, and shoreline protection laws and stormwater management laws.** Under delegated authority from VMRC, for example, most local governments administer and enforce the permitting processes involving tidal wetlands, shorelines, and dunes. Similarly, local governments administer the Chesapeake Bay Preservation Act and manage stormwater programs. Because strong implementation and enforcement of these laws and policies could have benefits for flood control and adaptation, more resources and technical support for local governments shouldering these responsibilities should be considered.
- **Provide resource and technical support for local governments who, under their zoning powers, flood control powers, and local road construction responsibilities, will be on the forefront of adopting many of the adaptation strategies necessary to protect human life and property from recurrent flooding.** While a significant amount of authority exists at the state level to be addressing recurrent flooding, many of the necessary measures will be adopted on a local level under a locality's zoning and flood control powers. The stronger and more uniform these measures are, the better prepared Virginia localities will be to limit individual harm or property loss. Local political subdivisions are responsible for county and local roads. Localities could be required to consider project recurrent levels into their comprehensive planning for their long-term infrastructure needs.
- **Consider requiring new and maintained infrastructure built by VDOT to withstand projected increases of recurrent flooding.** Although VDOT acknowledges in its long-range planning that future plans may need to address rising sea levels and flood waters, it does not require new infrastructure to be built to withstand projected increases recurrent flooding.

Notes

- 1 VIRGINIA INSTITUTE OF MARINE SCIENCE, RECURRENT FLOODING STUDY 13 (2013).
- 2 See Mary-Carson Saunders, The Dillon Rule and Norfolk Sea Level Rise, Virginia Coastal Policy Clinic, available at <http://law.wm.edu/academics/programs/jd/electives/clinics/vacoastal/docs/dillon.pdf>.
- 3 VA. CODE § 2.2-233.
- 4 *Id.*
- 5 VIRGINIA INSTITUTE OF MARINE SCIENCE, RECURRENT FLOODING STUDY 13 (2013).
- 6 VA. CODE § 28.2-1401; VA. CODE §§ 28.2-1300 to 1320.
- 7 VA. CODE § 28.2-1400 to 1420.
- 8 VA. CODE §§ 28.2-1300 to 1320.
- 9 Subaqueous lands are “beds of the bays, ocean, rivers, streams, or creeks.” See VA. CODE § 28.2-1203. VMRC has specific authority over permits by riparian property owners in the Potomac River appurtenant. See VA. CODE § 28.2-101.
- 10 *Id.*
- 11 The wetland zoning ordinance is promulgated in VA. CODE § 28.2-1302. The coastal primary sand dune ordinance is promulgated in VA. CODE § 28.2-1403.
- 12 *Id.*
- 13 *Id.*
- 14 Wetlands Guidelines, Virginia Marine Resources Commission, available at http://mrc.virginia.gov/regulations/wetlands_guidelines.pdf; Primary Coast Sand Dunes/Beaches Guidelines, Virginia Marine Resources Commission, available at http://mrc.virginia.gov/regulations/dune_guidelines.pdf.
- 15 VA. CODE § 28.2-1401.
- 16 VA. CODE § 28.2-104.1.
- 17 *Id.*
- 18 VA. CODE § 62.1-44.15:72.
- 19 *Id.*
- 20 VA. CODE § 62.1-44.15:52.
- 21 See VA. CODE § 10.1-560.
- 22 VA. CODE § 62.1-44.15:52.
- 23 VA. CODE § 62.1-44.15:51.
- 24 VA. CODE § 62.1-44.15:25.
- 25 Stormwater Management, Department of Environmental Quality, <http://www.deq.virginia.gov/Programs/Water/StormwaterManagement.aspx> (last visited Nov. 17, 2013).
- 26 VA. CODE § 62.1-44.15:25.
- 27 *Id.*
- 28 VA. CODE § 62.1-44.15:20.
- 29 *Id.*
- 30 VA. CODE § 62.1-44.15:21.
- 31 *Id.*
- 32 *Id.*
- 33 Virginia CZM Program Goals, Department of Environmental Quality, <http://www.deq.state.va.us/Programs/CoastalZoneManagement/DescriptionBoundary/Goals.aspx> (last visited Nov. 17, 2013).
- 34 *Id.*
- 35 Virginia Governor Executive Order No. 18 (2010).
- 36 *Id.*
- 37 Department of Conservation and Recreation, Strategic Plan 2012-2014, available at <http://www.dcr.virginia.gov/documents/dcr-strategic-plan-may-2013.pdf>.
- 38 VA. CODE § 10.1-701.
- 39 Shoreline Erosion, Department of Conservation and Recreation, http://www.dcr.virginia.gov/recreational_planning/wabshoero.shtml (last visited Nov. 17, 2013).
- 40 VA. CODE § 10.1-701.
- 41 All about the Virginia Department of Forestry, Virginia Department of Forestry, <http://www.VDOF.virginia.gov/aboutus/intro-vVDOF.htm> (last visited Nov. 17, 2013).
- 42 VA. CODE § 58.1-339.10.
- 43 Riparian Forest Buffers, Virginia Department of Forestry, <http://www.VDOF.virginia.gov/mgt/riparian/> (last visited Nov. 17, 2013).
- 44 VA. CODE § 58.1-339.10.
- 45 Riparian Forest Buffers Functions, Virginia Department of Forestry, <http://www.VDOF.virginia.gov/mgt/riparian/functions.htm> (last visited Nov. 17, 2013).
- 46 VA. CODE § 32.1-5.
- 47 VA. CODE § 32.1-248.
- 48 *Id.*
- 49 *Id.*
- 50 VA. CODE § 10.1-602.
- 51 VA. CODE § 10.1-1700.
- 52 VA. CODE § 10.1-602.

- 53 VA. CODE § 10.1-659.
- 54 VA. CODE § 10.1-602.
- 55 *Id.*
- 56 VA. CODE § 10.1- 603.18.
- 57 VA. CODE § 10.1-658.
- 58 VA. CODE § 10.1-1700.
- 59 VA. CODE § 10.1-1703.
- 60 VA. CODE § 36-139.18.
- 61 VA. CODE § 36-98.
- 62 *Id.*
- 63 *Id.*
- 64 VA. CODE § 15.2-2307.
- 65 *Id.*
- 66 VA. CODE § 15.2-4208.
- 67 See Virginia Coastal Planning District Commissions, <http://www.deq.state.va.us/Programs/CoastalZoneManagement/DescriptionBoundary/VirginiaCoastalPlanningDistrictCommissions.aspx>.
- 68 VA. CODE § 32.1-164.
- 69 12 VA. ADMIN. CODE 5-610-593.7.
- 70 VA. CODE § 10.1-1408.4.
- 71 *Id.*
- 72 *Id.*
- 73 VA. CODE § 10.1-1408.5(B).
- 74 Virginia Office of Intermodal Planning and Investment, VTrans 2035 Update: An Update to Virginia's Statewide Multimodal Long-Range Transportation Plan (Aug. 2013), available at <http://www.vtrans.org/vtrans2035.asp#VTrans2035>.
- 75 See William A. Stiles, Jr., A "Toolkit" for Sea Level Rise Adaptation in Virginia at 12, available at www.wetlandswatch.org/Portals/3/WW%20documents/sea-level-rise/ASCE%20Meeting%20Paper.pdf.
- 76 *Id.*
- 77 The Fiscal Year 2006 Virginia Economic and Fiscal Impacts of Virginia Port Authority Operations, The Mason School of Business Compete Center, College of William and Mary (2008).
- 78 VA. CODE § 62.1-132.5.
- 79 VA. CODE §§ 44-146.13 to 146.40.
- 80 VA. CODE § 44.146.18(B).
- 81 *Id.*
- 82 *Id.*
- 83 Commonwealth of Virginia Hazard Mitigation Plan, Section 3.7, available at <http://www.vaemergency.gov/em-community/recovery/haz-mit-plans>.
- 84 *Id.*
- 85 VA. CODE § 44.146.18(B).
- 86 The Commonwealths Transportation Agency, Virginia Department of Transportation, http://www.virginiadot.org/about_vdot/default.asp (last visited Nov. 17, 2013).
- 87 Virginia Department of Transportation, Virginia Hurricane Evacuation Guide (2013), available at <http://www.virginiadot.org/travel/resources/hurricaneEvacuation1.pdf>.
- 88 *Id.*
- 89 VA. CODE § 33.1-223.2.

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