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Go Green, Save Money:

Lowering Flood Insurance Rates in Virginia with Stormwater Management and Open Space

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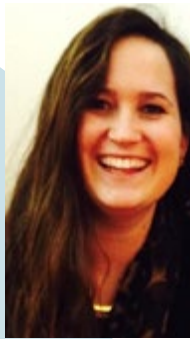
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About the Authors

Adele Young is a recent graduate of William & Mary Law School and former member of the Virginia Coastal Policy Clinic. Adele was a Senior Article Editor of the *Environmental Law & Policy Review*, and published *Caged Cats: Private Ownership of Lions and Tigers*. Before law school, she was a paralegal for Shearman & Sterling LLP, working in the Environmental and Property Group. She spent a summer volunteering for the U.S. Fish & Wildlife Service in Barrow, Alaska, and was recently a summer law clerk for the Department of the Interior, Office of the Solicitor, where she worked with the U.S. Fish & Wildlife Service and the Bureau of Land Management in Sacramento, California. She graduated from Cornell University in 2009 with a B.A. in Classics and Philosophy. She is an admitted attorney in the State of Colorado.



Kristen Clark is a third-year law J.D. candidate at William & Mary Law School and also received a Bachelor's in Government and Biology from William & Mary in 2012. Kristen is an alumna of the Virginia Coastal Policy Practicum, completing the course in the spring of 2014. Participating in the clinic helped Kristen confirm that she wants to pursue a career involving environmental and land use issues.

In the summer of 2014 Kristen interned with the Southern Environmental Law Center in Charlottesville, Virginia. She has also held internships during law school with the Chesapeake Bay Foundation and AquaLaw. Kristen will be interning with the VA Office of the Attorney General in the Environmental Section during the spring 2015 semester.

About the Virginia Coastal Policy Center

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

With two nationally prominent science partners – the Virginia Institute of Marine Science, one of the largest marine research and education centers in the United States, and Virginia Sea Grant, a nationally recognized broker of scientific information – 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 College and across the country. With access to internationally recognized scientists at VIMS, to Sea Grant's national network of legal and science scholars, and to elected and appointed officials across the nation, VCPC engages in a host of information exchanges and collaborative partnerships.

VCPC grounds its pedagogical goals in the law school's philosophy of the citizen lawyer. VCPC students' highly diverse interactions beyond the borders of the legal community provide the framework for their efforts in solving the complex coastal resource management issues that currently face Virginia and the nation. Whether it is working to understand the underlying realities of local zoning policies or attempting to identify and reconcile the concerns of multiple stakeholders, VCPC students experience the breadth of environmental lawyering while gaining skills that will serve them well regardless of the legal career they pursue upon graduation.

VCPC is especially grateful to Chesapeake Bay Trust for providing generous funding to support this project. VCPC also thanks the Virginia Environmental Endowment for its continuing support.

Executive Summary

Coastal communities in Virginia are confronting increasing risks of flooding and storm damage. They face the highest rate of relative sea level rise on the Atlantic Coast. In addition to this growing threat, restoring the health of local streams, rivers, wetlands, and shorelines remains critical to preserving important habitat, improving water quality, and saving the Chesapeake Bay. Meanwhile, as these pressures increase regulatory expectations and costs for local governments, both stormwater fees and flood insurance rates are rising for homeowners. **One way local governments can save constituents money and build support for stronger environmental protection is to participate in the Federal Emergency Management Agency's (FEMA) "Community Rating System" (CRS) program -- a voluntary incentive program that awards credits to communities that implement proactive measures to reduce flood risk.**¹ The CRS program rewards many of the various measures that Virginia localities must undertake to improve environmental quality. From managing stormwater, conserving open space, and promoting green infrastructure, Virginia localities can both "go green" and save money.

The CRS Program: A Snapshot

A community receives a CRS rating from one to ten – one is the highest, ten is the lowest – based upon the total number of credits it receives for its flood mitigation activities. The CRS Coordinator's Manual sets forth the nineteen creditable activities and assigns credits for each activity based upon the degree to which an activity advances the goals of the program. Policyholders in a CRS Class 5, for example, receive a 25% discount if they live in the special flood hazard area (SFHA) or "regulatory floodplain." Five hundred (500) credits is enough to move one class rating higher, resulting in an additional 5% discount to policyholders.

Virginia has 114,247 flood insurance policies in force, with combined annual premiums of \$75.7 million.² Of this number, 55,076 policyholders are in CRS participating communities, resulting in a total savings of \$2.84 million.³ A little more than half who are eligible in Virginia, however, are not in a CRS community.⁴ Indeed, only 5% of Virginia communities that could participate do so.⁵ By increasing the number of communities that participate in CRS, and by increasing the credit totals for communities that already participate, Virginians have the potential to save many more millions in flood insurance premiums – **and stormwater management and open space preservation are excellent ways to do so, generating together a total of 2,775 potential credits under the CRS program.** While it is difficult to achieve all of these credits, enough credits are available help a community achieve real savings.

- **Compliance with Virginia's new Stormwater Management Act should generate 169 CRS credits for localities participating in the CRS program.**⁶ This number is almost double the current Virginia average currently received under CRS for stormwater management. A maximum of 755 credits are available for Stormwater Management (CRS Activity 450). Currently, the Virginia average credit is 87, with credits varying across localities, from 20 in Roanoke to 187 in Arlington.⁷ From incorporating Low Impact Development (LID) designs, to controlling runoff for all development in the community, to implementing local Total Maximum Daily Load (TMDL) action plans, Virginia localities have the potential to greatly increase the credit earned in this area.

- **Because compliance with Virginia's new Stormwater Management Act should generate 169 CRS credits for localities, FEMA and the Commonwealth should work to revise Virginia's uniform minimum credit (UMC) to reflect these new regulations.** The CRS program awards UMC for programs, laws, or regulations that a state or regional agency implements and enforces in localities that aid in floodplain management and reduce flood damage.⁸ Under Activity 450, Virginia currently receives 30 credits for erosion and sediment control and 20 credits for water quality.⁹ The UMC should be revised to reflect the new regulations.
- **Localities enforcing the Chesapeake Bay Preservation Act (CBPA) have the ability to earn an additional 90 credits for Stormwater Management (Activity 450) if all development is regulated except for increases of impervious area of 5,000 square feet or less.**¹⁰
- **While preserving open space in the floodplain can provide up to 2,020 credits for communities participating in CRS, the average Virginia locality only earns 138 credits in the open space category, much lower than the national average of 474.**¹¹ A great opportunity exists to capitalize on available open space credits, and to encourage further open space preservation in the floodplain.

The following charts summarize some of the major CRS credit opportunities for Virginia for stormwater management and open space preservation.²⁰

ACTIVITY 450: STORMWATER MANAGEMENT -- 775 credits total

Localities that comply with the stormwater regulations have the potential to receive credits under four separate approaches: 1) Stormwater Management Regulations, 2) Watershed Master Planning, 3) Erosion and Sediment Control, and 4) Water Quality.

1. Stormwater Management Regulations.

Qualifying for credit under stormwater management regulations includes four sub-elements: 1) Size of development, 2) Design storm, 3) Low impact development, 4) Public inspection and maintenance.

SUB-ELEMENT	CRS REQUIREMENTS	VIRGINIA SOURCE OF CREDIT	ESTIMATED CREDITS
Size of Development Max Credits: 110	The community must regulate, at a minimum, parcels of 5 acres or more or increases in impervious area of 20,000 sq. ft. or more. ¹²	VA Stormwater Management Act (VSMA) / VA Stormwater Management Program (VSMP). VSMA regulates land-disturbing activities that disturb more than 1 acre of land. ¹³	60 Credits
		Chesapeake Bay Preservation Act. Locations within Tidewater Virginia are required to regulate land disturbing activities that are equal to or greater than 2,500 sq. ft. in areas that are subject to preservation area designation and management regulations. ¹⁴	Up to 90 Credits
Design Storm Max credits: 25	Community must require management of at least a ten-year storm. Regulations must require pre- and post-development hydrology calculations and post-development runoff must be limited to pre-development levels. ¹⁵	VA Stormwater Management Act/VSMP. The land-disturbing activities regulations should be designed to reduce the allowable peak flow rate resulting from a 10-year, 24-hour storm to a level that is less than or equal to the peak flow rate from the site assuming it was in good forested condition. The design storms cited in the regulations are the one-year, two-year, and 10-year 24-hour storms. The regulations require pre-development and post-development runoff characteristics and hydrology to be verified. The regulations credit, but do not require volume reduction. ¹⁶	14 credits 21 credits if volume also controlled
Low Impact Development Max Credits: 25	Regulatory language requires the implementation of LID techniques when new development occurs. ¹⁷	VA Stormwater Management Act/VSMP. The VSMA regulations provide a list of best management practices (BMPs) that are approved to reduce the phosphorus load and runoff volume in accordance with the Virginia Runoff Reduction Method. It is likely that a locality may only get LID credit if it adopts an ordinance that only allows the LID BMPs to be utilized for compliance with the regulations. ¹⁸	Up to 25 credits VSMP authorities have the authority to establish limitations on the use of specific BMPs, so the credits that are generated will vary among localities based on which BMPs they decide to incorporate.
Public Inspection and Maintenance Max credits: 20	Inspection and maintenance of stormwater management facilities must be required. ¹⁹	VA Stormwater Management Act/VSMP. The stormwater regulations require the VSMP authority to require the provision of long-term responsibility for and maintenance of stormwater management facilities. The requirements must run with the land, provide for all necessary access for purposes of maintenance and regulatory inspections, provide for inspections and maintenance and submission of inspection and maintenance reports to the VSMP authority, and be enforceable by all appropriate governmental parties. ²⁰	20 credits

¹ Please note that the number of credits that compliance with Virginia regulations may generate is an estimate. CRS officials will determine the amount of credits that localities actually receive.

2. Watershed Master Plan.

Up to 315 credits are provided for plans that evaluate future conditions and long-duration storms, identify wetlands and natural areas, address the protection of natural channels, and provide a dedicated funding source for implementing the plan.

CRS Requirements	Virginia Source of Credit	Estimated Credits
The community must regulate, at a minimum, parcels of 5 acres or more or increases in impervious area of 20,000 sq. ft. or more. ²¹	The following Virginia Actions may generate some credit: <ul style="list-style-type: none">· WIPs· TMDL action plans· Regional cooperation efforts like watershed studies and coordination	Up to 315 but varies widely

3. Erosion and Sediment Control.

Up to 40 credits are provided if the locality requires that erosion and sediment control measures be taken on land that is disturbed during development.

CRS Requirements	Virginia Source of Credit	Estimated Credits
The community must apply erosion and sediment control regulations to all construction sites within the community. The number of credits generated varies depending on the size of the disturbed land that is regulated. <ul style="list-style-type: none">· 40 credits if regulations control soil loss from any disturbed land greater than 1,000 square feet· 30 credits if regulations control erosion and soil loss from disturbed land greater than 0.5 acres· 10 credits if regulations control erosion and soil loss from disturbed land greater than 1 acre.²²	VA Stormwater Management Act/VSMP. Developers must provide stormwater pollution prevention plans, which include an approved erosion and sediment control plan that is consistent with the Virginia Erosion and Sediment Control regulations. Prior to land disturbance, the VSMP authority must approve the plan, and it must be designed and implemented during construction activities. Virginia Erosion and Sediment Control Law. This law applies to land-disturbing activities of 10,000 square feet or more. Therefore, all localities should receive 30 credits if they comply with the Erosion and Sediment Control Law. ²³	At least 30 credits

4. Water Quality.

Up to 20 credits are available for implementing BMPs to protect water quality in the community.

CRS Requirements	Virginia Source of Credit	Estimated Credits
To receive credits, the community's stormwater management regulations must either specify one or more measures or refer to BMPs as published in an official government reference ²⁴ .	Virginia Stormwater Management Act: As of July 1, 2014, the Virginia Stormwater Management Handbook reflects changes to the Virginia Stormwater BMPs. Currently, approved stormwater BMPs are listed in the BMP Clearinghouse. The regulations provide a list of BMPs that are approved to reduce the phosphorus load and runoff volume in accordance with the Virginia Runoff Reduction Method. The new regulations limit the phosphorus load to 0.41 pounds per acre per year in order to achieve no net increase in nutrients for new development and there are also limits on redevelopment. ²⁵	Close to 20 Credits

Sections of the CRS manual, other than Activity 450, allow for the generation of credits due to stormwater actions taken by a locality. Stormwater retrofits, for example, may generate credits under Activities 530 and 540, as noted in the chart below.²⁶

Stormwater Retrofitting: Possible CRS Credits	
Activity 530 Flood Protection ²⁷	This activity provides credit for buildings that have been protected from flood damage by being retrofitted or by the placement of certain types of flood control structures that protect buildings to at least the 25-year flood level. Examples of structural flood control projects that receive credit are channel modifications, storm drain improvements, diversions, and small reservoirs.
Activity 540 Drainage System Maintenance ²⁸	This activity is focused on keeping channels and storage basin clear of debris so that their flood carrying and storage capacity are maintained. One of the elements of this section is focused on capital improvement programs. It provides a maximum of 70 credits for the implementation of a capital improvement plan that makes permanent, structural changes to the drainage system to reduce flood problems or maintenance programs. It must be a continuous maintenance program, not a one-time improvement. Once a capital improvement is complete, it may generate credit under 530 (flood protection).
Other	If a community has invested in retrofitting of old stormwater systems, it should look through the CRS for activities that resemble their improvements. If a community's stormwater retrofitting does not fit into an activity, the community should ask the CRS officials if credit can be received for their actions.

SECTION 420: OPEN SPACE-- 2,020 credits total

A community may either acquire property for preservation, acquire easements limiting development, or require or incentivize private protection of open space and other floodplain areas. The number of credits that compliance with Virginia law or participation in Virginia programs is difficult to estimate, as the credit received depends on the enforceability of the preservation measures, the longevity of the protections, and the extent to which natural functions of the area are preserved. The following chart summarizes how credits may be earned under existing Virginia law and programs.

1. Open Space Preservation. Up to 1,970 credits.

CRS Requirements	Virginia Source of Credit
<p>Open Space Preservation 1,450 credits</p> <p>1. Parcel located in the floodplain.</p> <p>2. Parcel contains no buildings. Pavilions, gazebos, bleachers, and tractor sheds are permitted. If the land is over ten acres, a building is permitted.</p> <p>3. Parcel not be filled or used to store materials. Activities such as plowing, sand dune construction, beach nourishment, and repairing flood levees are permitted.</p> <p>4. Parcel preserved as open space. The land must be owned as a open space by the municipality or state, by a non-profit, or regulated to preserve open space.</p>	<p>Chesapeake Bay Preservation Act (CBPA).²⁹ The CBPA requires a 100-foot wide buffer area landward of Chesapeake Bay waters, called the "Resource Protection Area." CBPA regulations limit land development within the RPA to water dependent activities, redevelopment, zoned Intensely Developed Areas, permitted encroachments, certain roads, or flood control facilities.³⁰ If the community restricts development in the RPA, that open space can count towards Open Space Preservation credits because it is regulated to preserve open space.³¹</p> <p>Tidal Wetlands Act³² If the wetlands board has preserved lands in the floodplain, the land may qualify for open space preservation credits, because the open space is preserved under Tidal Wetlands Act regulations.</p> <p>Coastal Primary Sand Dunes and Beaches Act (SD&BA).³³ If the wetlands board has preserved land in the floodplain, including sand dunes, it may qualify for open space preservation credits. The land can count for credit because the open space is preserved under a regulation, the Coastal Primary Sand Dunes and Beaches Act (SD&BA) (and any local corresponding ordinance). If the local wetlands board adheres to the Act and preserves open space by not permitting the leveling of sand dunes, then building and filling would not occur. Beach renourishment is not considered filling, and would not disqualify the land from open space credits.</p> <p>Open Space Land Act³⁴ and Virginia Conservation Easement Act.³⁵ Actual land preserved in the floodplain via an open space easement will also count towards Open Space Preservation if the easement prohibits building and filling. Under the Open Space Land Act, any county or municipality, or a state entity such as the Virginia Outdoors Foundation (VOF) may hold the open space easements.³⁶ Also, under the Virginia Conservation Easement Act, many land trusts have been set up in Virginia, which would likely also qualify for open space credit. Depending upon the type of easement (agricultural or conservation), and use and location of the land, the open space land may qualify for Natural Shoreline or Natural Functions credits in addition to open space credits.</p>

Land that meets the four criteria for Open Space Preservation may also qualify for the following additional credits:	
CRS Requirements	Virginia Source of Credit
<p>Deed Restrictions. 50 credits</p> <p>1. Parcel must contain a restriction in the deed prohibiting new buildings on the land.</p> <p>2. The deed restriction must transfer to future owners.</p> <p>3. The deed restriction can only be amendable by a court for just cause.</p>	<p>Locally recorded deeds could generate credits.</p>
<p>Natural Functions Preserved. 350 credits. Credit may be earned if:</p> <p>1. Parcel is managed in its natural state or is restored to its natural state</p> <p>2. Parcel is designated as critical habitat for threatened or endangered species</p> <p>3. Parcel is a designated open space corridor or connected network of wetlands, woodlands, wildlife habitats.</p> <p>NOTE: Federally owned lands do not count towards any open space credit.</p>	<p>Chesapeake Bay Preservation Act.³⁷</p> <p>The CBPA explains that in order to maintain the functional value of the buffer area, existing vegetation in the Riparian Protection Area (RPA) can only be removed to preserve sight lines, paths must be designed to control erosion, dead, diseased or noxious weeds such as Kudzu can be removed, and shoreline erosion projects can be undertaken. If the community preserves the RPA's natural functions, it can count towards Natural Functions Preserved credits for a possible total of 170 credits.³⁸</p> <p>Wetlands Preservation Act.³⁹</p> <p>A parcel may also qualify for Natural Functions Open Space if the land has preserved due to its status as a productive wetland for a possible total of 170 credits. Additionally, if it is a tidal wetland that is preserved, it may also qualify for Natural Shoreline Protection (120 pts) credits because of the function tidal wetlands serve in protecting shorelines.</p>
<p>Natural Shoreline Protection. 120 credits.</p> <p>Credit can be earned if the parcel is regulated or managed to prohibit:</p> <p>1. In riverine areas - Rip rap or armoring, channel alterations, dredging, filling, grubbing, and removal of vegetation.</p> <p>2. On shorelines – filling or beach alterations, including beach nourishment, alterations to sand dunes, construction of seawalls, bulkheads, armoring, or other shoreline stabilization structures.</p> <p>Removal of a levee, restoring natural habitat, and planting to preserve dunes is permitted.</p>	<p>Chesapeake Bay Preservation Act.⁴⁰</p> <p>The CBPA explains that preserving the RPA provides for the removal, reduction, or assimilation of sediments, and states that the RPA shall include tidal wetlands, nontidal wetlands connected by surface flow, tidal shores, and a 100 ft. buffer area. If a locality enforces this regulation, the natural shoreline will be preserved and the land should count towards Natural Shoreline Protection credits.⁴¹</p> <p>Wetlands Preservation Act.⁴²</p> <p>If it is a tidal wetland that is preserved, a wetlands parcel it may also qualify for credits under Natural Shoreline Protection because of the function tidal wetlands serve in protecting shorelines.</p>
2. Other Floodplain Protections. Land that is in the floodplain but DOES NOT meet the four criteria for Open Space Preservation may qualify for the following credits:	
CRS Requirements	Virginia Source of Credit
<p>Open Space Incentives. 250 credits.</p> <p>Credit may be earned if the community offers any of the following incentives:</p> <p>1. Lowered proffers or impact fees when developers locate outside of the floodplain</p> <p>2. Zoning regulations that allow cluster development such as a Planned Unit Development</p> <p>3. Requiring greenways and setbacks in areas being developed</p> <p>4. Programs that provide tax incentives to keep land open.</p>	<p>Chesapeake Bay Preservation Act.⁴³</p> <p>The CBPA Intensely Developed Areas allows areas of existing development and infill sites where little natural environment remains to be designated as a redevelopment area. Open Space Incentive 422e-OS15 provides credits for regulations that allow cluster development, such as an Intensely Developed Area.⁴⁴</p>
<p>Low-Density Zoning. 600 credits.</p> <p>Credit can be earned if land lot sizes are at least five acres. Uses may be agricultural, conservation, or residential.</p>	<p>Local low-density zoning could generate credits.</p>

Go Green, Save Money:

Lowering Flood Insurance Rates in Virginia with Stormwater Management and Open Space

Coastal communities in Virginia are confronting increasing risks of flooding and storm damage as a consequence of climate change. They are facing the highest rate of relative sea level rise on the Atlantic Coast. In addition to this growing threat, restoring the health of local streams, rivers, wetlands, and shorelines remains critical to preserving important habitat, improving water quality, and saving the Chesapeake Bay. Meanwhile, as these pressures increase regulatory expectations and costs for local governments, both stormwater fees and flood insurance rates are rising for homeowners.

In fact, every year in Virginia, flooding damage costs homeowners and businesses millions of dollars -- flooding damage totaled \$2,477,000 in the Commonwealth in 2012 alone.⁴⁵ The National Flood Insurance Program (NFIP) provides flood insurance policies, often at a subsidized rate, but many Virginians will see their policy premiums increase in 2015. One way local governments can save constituents money and build support for stronger environmental protection is to participate in FEMA's Community Rating System (CRS) program -- a voluntary incentive program that awards credits to communities that implement proactive measures to reduce flood risk.⁴⁶ All of these pressures have heightened local awareness of the need to find ways to protect public safety, find way to utilize green infrastructure to control flooding and improve water quality, and mitigate the economic costs of these developments.

The CRS program rewards many of the very measures that Virginia localities must undertake to improve environmental quality. The purpose of this paper is to examine the concrete ways in which managing stormwater, conserving open space, and promoting green infrastructure help Virginia localities both "go green" and save money. The paper first provides an overview of how rising flooding threatens Virginia communities and explains how recent changes to the NFIP will likely raise rates for some flood insurance policyholders. Next, it provides an overview of the CRS program. The paper then explores two CRS activities -- stormwater management and open space preservation -- in detail. Stormwater management and open space preservation can generate a total of 2,775 credits under the CRS program, an amount of credits that could result in significant flood insurance discounts. Many of these actions are necessary to improve water quality -- that they happen to serve flood control purposes and generate flood insurance discounts under the CRS program are additional benefits that serve to protect the public's safety and reduce costs for the community.

Overview: Rising Waters, Rising Rates

As sea level rises and subsidence continues throughout coastal Virginia, recurrent flooding is damaging properties and the environment. Since 1930, the National Oceanic and Atmospheric Administration has recorded a 14.5 inch increase in mean sea level rise at Sewell's Point, Virginia. The sea level is predicted to rise further -- the Virginia Institute of Marine Science (VIMS) estimates 1.5 additional feet by 2050.⁴⁷ Greater flooding translates to higher costs for property owners and taxpayers, with the greatest impacts falling on Virginia's coastal regions. Properties that frequently flood are known as repetitive loss properties; they are especially susceptible to flooding damage and their numbers are on the rise. Between 2008 and 2011 alone, the City of Norfolk's number of properties with repetitive loss payouts over \$1 million almost tripled-from 282 to 738.⁴⁸

Additionally, as noted in the figure below, with the passage of the Biggert-Waters Act and the Homeowner Flood Insurance Affordability Act of 2014 (HFIAA), many homeowners and businesses are losing federal subsidies for flood insurance rates, and communities are concerned about the increasing flooding events and rising flood insurance rates.⁴⁹ The HFIAA rolls back some of the changes made in 2012 by preserving grandfathered status to owners of properties that were originally built to code but later found to be at a higher risk, allowing the transfer of grandfathered subsidies to new owners, and capping primary residence premium increases at 18 percent per year.⁵⁰ For owners of second homes in a flood zone and properties which repeatedly flood, premiums will increase by 25 percent per year until they reach a level that reflects the actual risk. **In Virginia, 18% of the state's 114,880 policies will continue to see their premiums rise.**⁵¹

Biggert-Waters (2012)	HFIAA (2014)
Sale/New Policy Trigger (premium increases triggered by new property/new policy purchase)	Repeals the Sale/New Policy Trigger Allows new owners to assume the old policy at the current rate (so the policy stays with the property, not the owner)
Remapping Trigger (5 year phase-out of grandfathering triggered by new flood map)	Repeals the Remapping Trigger Restores grandfathering of properties in flood zone when built to code
Annual Premium Increases	Primary Home: Capped at 18% per year per property Second Home/Business: Capped at 25% increase per year until rate reflects actual risk

The Community Rating System

FEMA administers the NFIP, and will be reducing the subsidies provided in many premiums. FEMA also administers the CRS, a voluntary program that decreases the flood insurance premiums of all NFIP policyholders in the community. In Virginia, 55,076 NFIP policyholders are already in CRS participating communities. This participation has resulted in a total savings of \$2,844,066 to those policyholders.⁵² However, 59,171 Virginian policyholders – a little more than half that are eligible – are not in a community that participates in CRS.⁵³ Indeed, altogether, only 5% of all Virginia communities that could participate do participate.⁵⁴ By increasing the number of communities that participate in CRS, and by increasing the point totals for communities that already participate, Virginians have the potential to save many more millions in flood insurance premiums.

Communities that participate in CRS receive credits for flood-related activities such as improving stormwater management, preserving open space in the floodplain, educating local residents on flooding impacts, and saving building elevation certificates. When a community accumulates 500 credits from the activities it undertakes, the community will move up one “class.” This move means the flood insurance premiums for all NFIP policyholders in that community’s Special Flood Hazard Area (SFHA), or 100-year floodplain, will receive an additional 5% discount on their flood insurance rates. Policyholders not in a SFHA will also receive a lesser discount. Each CRS class correlates to 500 credits, and an additional 5% discount on flood insurance rates in the SFHA, as the following chart indicates:

CRS Class	CRS Credits	Rate Reduction
10	0-499	SFHA- 0% Other- 0%
9	500-999	SFHA- 5% Other-5%
8	1,000-1,499	SFHA- 10% Other-5%
7	1,500-1,999	SFHA- 15% Other- 5%
6	2,000-2,499	SFHA- 20% Other- 10%
5	2,500-2,999	SFHA- 25% Other- 10%
4	3,000-3,499	SFHA- 30% Other- 10%
3	3,500-3,999	SFHA- 35% Other- 10%
2	4,000-4,499	SFHA- 40% Other- 10%
1	4,500+	SFHA- 45% Other- 10%

Activity 450: Stormwater Management

A maximum of 755 CRS credits are available in Stormwater Management, Activity 450. Currently, the Virginia average credit is 87, with credits varying across localities, from 20 in Roanoke to 187 in Arlington.⁵⁵ **Compliance with Virginia's Stormwater Management Act should generate 169 credits for participating CRS communities.⁵⁵ This number is almost double the current Virginia average for stormwater management.** Because Virginia has enacted a new law and regulations to improve stormwater management in the Commonwealth, an opportunity exists for localities to improve their CRS rating while they simultaneously improve water quality. This section first provides an overview of the new law and regulations. It then turns to exploring how these regulations may be integrated with CRS requirements for credit under Activity 450, Stormwater Management.

New Virginia Stormwater Management Regulations

New regulations to improve water quality, critical to improving the health of Virginia waterways and the Chesapeake Bay, create opportunities for Virginia policy holders in CRS communities to lower their flood insurance premiums. Virginia is in the process of complying with the Chesapeake Bay TMDL, which places limits on the amount of pollutants that may be discharged into the Bay watershed.⁵⁷ To assist with meeting its TMDL requirements, Virginia has been in the process of changing its stormwater management regulations.

The 2012 VSMA requires the State Water Control Board (SWCB) to permit, regulate, and control stormwater runoff in the Commonwealth.⁵⁸ Prior to 2013, Virginia's stormwater regulatory system was split between the Virginia Department of Conservation and Recreation (DCR) and the Department of Environmental Quality

(DEQ). DEQ administered the Virginia Pollutant Discharge Elimination System (VPDES) industrial activity stormwater permitting and DCR handled construction stormwater permitting and MS4 permitting.⁵⁹ On July 1, 2013 Virginia consolidated the stormwater regulation, making DEQ the lead agency for the VSMA.⁶⁰

Virginia Stormwater Management Program Authorities

Beginning July 1, 2014, local governments will be the primary Virginia Stormwater Management Program authorities, a change that essentially transfers oversight and enforcement of stormwater management to localities from the state.⁶¹ As of spring 2014, however, the mandate that all localities adopt Virginia Stormwater Management Programs (VSMPs) changed. In spring 2014, Governor McAuliffe signed SB 423 (Hanger), which allows localities that are not regulated Municipal Separate Storm Sewer Systems (MS4s) to choose to let the state, through the Department of Environmental Quality (DEQ), operate a VSMP on their behalf.⁶² Towns, including those that operate an MS4, can choose to establish their own programs or become subject to the county's VSMP program.⁶³ A county's VSMP program is required to account for the towns lying within the county unless the town notifies the state that it chooses to adopt its own program.⁶⁴

MS4s are owned by the locality and consist of road drainage systems, municipal streets, catch basins, curbs, gutters, ditches, and storm drains designed to collect and convey stormwater. MS4s were developed in two phases and are based on the size of the locality:

- Phase I- Larger localities- operators of MS4s that serve populations of greater than 100,000 people. Authorized under individual VSMP permits. Virginia has eleven Phase I MS4 localities.
- Phase II- Smaller localities- operators of small MS4s in "urbanized areas" (as defined by the latest decennial census). Operated by cities, counties, towns, federal facilities, military bases, Veteran's Affairs hospitals and research facilities, Department of Defense facilities and parkways, and state facilities such as VDOT, community colleges and public universities. Regulated under a general permit. Virginia has 89 permitted Phase II MS4s.

Sources: Virginia Department of Environmental Quality, Virginia Stormwater Management Program Regulations; Chesapeake Bay TMDL Watershed Implementation Plan Section 6 Urban/Suburban Stormwater.

VSMP regulations and ordinances ensure that localities with VSMP programs comply with other applicable laws. For localities that elect to become DEQ enforced VSMPs, DEQ will continue to oversee the local programs to ensure that all applicable state laws, such as the CBPA and Virginia Erosion and Sediment Control Act, as well as TMDLs, are applied and enforced.⁶⁵ DEQ estimates that the new fee schedule that takes effect July 1, 2014 could generate about \$800,000 in nongeneral fund revenue which could go towards administering the DEQ-run VSMPs.⁶⁶ This revenue should benefit rural and less populated counties which are not prepared for and do not have the resources to administer their own programs.

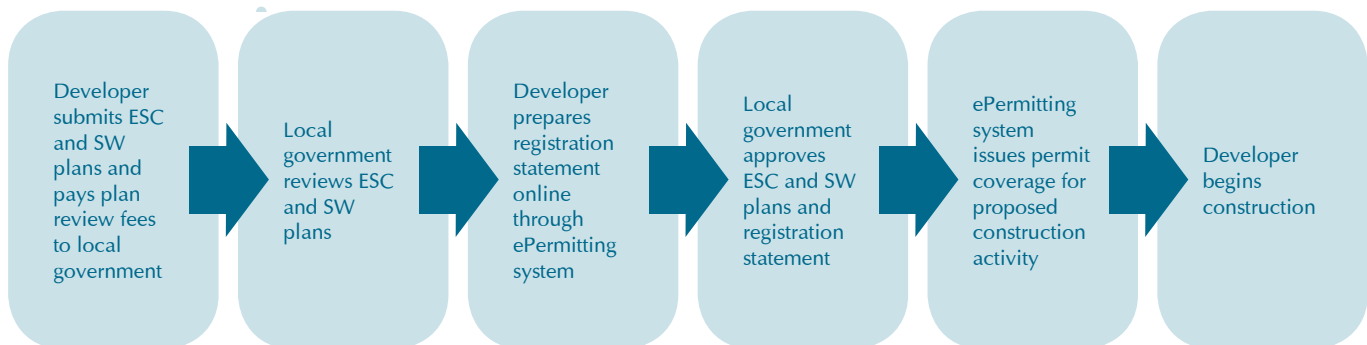
To become a Virginia Stormwater Management Program authority, Virginia localities must adopt model ordinances that incorporate VSMA and VSMP regulations.⁶⁷ Prior to the consolidation of stormwater within DEQ, DCR developed a Stormwater Management Model Ordinance, which is still used by localities to establish a VSMP consistent with the VSMA.⁶⁸ The VSMA authorizes localities to adopt more stringent ordinances than those necessary for compliance, but the stricter

ordinances need to be based upon factual findings.⁶⁹ A locality may implement stricter regulations if the facts indicate that stricter ordinances are “necessary to prevent any further degradation to water resources, to address TMDL requirements, to protect exceptional state waters, or to address specific existing water pollution ... or excessive localized flooding.”⁷⁰

Before an ordinance is adopted, the locality must give due notice and hold a public hearing. After an ordinance is adopted, the locality must submit a letter to DEQ explaining why the more stringent ordinance is necessary.⁷¹ DEQ will then determine whether the ordinance meets the requirements of the Stormwater Management Act and whether the more stringent requirements are supported by factual evidence.⁷² **This is a critical point for CRS purposes. If localities decide to take additional measures to control stormwater that exceed existing Virginia requirements in order to generate additional CRS credits, the localities should ensure they follow the statutory provisions under the Act to do so.**

The Permitting, Plan Approval, and Compliance Process

The purpose of the VSMA is to regulate land-disturbing activities and control stormwater runoff from development, both during construction and post-development.⁷³ A permit – known as a “VSMP permit” – is required for land-disturbing activities equal to or greater than one acre, and land disturbing activities less than one acre that are part of a larger common plan of development that disturbs one or more acres.⁷⁴ Developers also must submit Stormwater Pollution Prevention Plans (SWPP), which include erosion and sediment control plans, before applying for a permit using the state’s online system.⁷⁵ Once the SWPPP is approved by either a local government that elected to implement the program or DEQ, the developer will obtain the VSMP permit from DEQ.⁷⁶ The pre-development process is summarized below:



Once the developer begins construction, the locality is then responsible for inspecting the construction sites to ensure development is in compliance with the approved SWPPP, enforcing the provisions of the local Stormwater Management Ordinance, and overseeing the maintenance of long-term stormwater management controls.⁷⁷ The new emphasis on post-development inspection, enforcement, and maintenance should help reduce the quantity of runoff entering Virginia’s waters and improve water quality.

Virginia Localities: Generating CRS Credits Through Stormwater Management

Stormwater Management, under CRS Activity 450, generates a maximum of 755 credits. The CRS Manual lists different stormwater activities that prevent future development from increasing flood hazards to existing development as well as maintain and improve water quality.⁷⁸ Credits are granted for four approaches to managing new development in the watershed:

1. Stormwater Management Regulations
2. Watershed Master Planning
3. Erosion and Sediment Control
4. Water Quality⁷⁹

Currently, the Virginia average credit is 87 credits for section 450, with credits varying across localities from 20 in Roanoke to 187 in Arlington.⁸⁰ At a minimum, Virginia localities in compliance with Virginia's stormwater management program should be eligible for 169 credits,⁸¹ not including the mandatory impact adjustments.

Stormwater Management Regulations

To qualify for CRS credit under Activity 450, stormwater management regulations must require peak runoff from new development to be no greater than the runoff from the site in its pre-development condition.⁸² The VSMA requires VSMPs to “maintain after-development runoff rate of flow and characteristics that replicate, *as nearly as practicable*, the existing predevelopment runoff characteristics...or improve upon the contributing share of existing predevelopment runoff characteristics...if flooding is a predevelopment condition.”⁸³ This requirement closely resembles the language found in the CRS manual and should allow localities to receive credit for complying with different approaches within this section.

Four sub-elements within the stormwater management regulations can generate credits: size of development, design storm, LID regulations, and requirements for inspection and maintenance. In order to receive any credit for stormwater management regulations, the community must have credit for **size of development** and **design storm**, and the majority of the credits for this approach are awarded for these two threshold elements.⁸⁴ The threshold credit criteria for stormwater management regulations are summarized below:

Stormwater Management Regulations: Threshold Credit Criteria	
1.	The watershed must be subject to a regulation that requires the peak runoff from new development to be no greater than the runoff from the site in its pre-development condition
2.	A community must have credit for size of development (SZ) and design storm (DS)
3.	For SZ credit, the community must, at a minimum, regulate parcels of 5 acres or more or increases in impervious area of 20,000 square feet or more
4.	For DS credit, the community must require management of at least a 10-year storm
5.	For DS credit, the community's regulations must require pre- and post-development hydrology calculations and post-development runoff must be limited to pre-development levels
Source: CRS Coordinator's Manual 450-5.	

Sub-Element (1): Size of Development

To meet the size of development requirement, the community must, at a minimum, regulate parcels of five acres or more or increases in impervious area of 20,000 square feet or more.⁸⁵ The size of development credits are awarded based upon the minimum size of areas regulated, with a maximum of 110 credits available.⁸⁶

Size of Development Credit Opportunities	
All development is regulated	110 credits awarded
All development is regulated except for single family residences, parcels of 1/2 acre or less, or increases in impervious area of 5,000 square feet or less	90 credits awarded
All development is regulated except for parcels of 1 acre or less or increases in impervious area of 10,000 square feet or less	60 credits awarded
All development is regulated except for parcels of 1 acre or less or increases in impervious area of 10,000 square feet or less	15 credits awarded

The VSMA regulates land-disturbing activities that disturb more than one acre of land.⁸⁷ A land-disturbing activity is defined as “a man-made change to the land surface that potentially changes its runoff characteristics...”⁸⁸ **A locality is awarded 60 credits if all development is regulated except for parcels of land one acre or less or increases in impervious area of 10,000 square feet or less.⁸⁹ Therefore, localities in Virginia should generate 60 credits for complying with this requirement of the VSMA.**

Chesapeake Bay Preservation Act

As noted above, DEQ will ensure that localities are in compliance with other state laws in addition to the VSMA. One of the additional laws that DEQ oversees is the CBPA, which defines land-disturbing activity differently than the VSMA. The CBPA is intended to improve the Chesapeake Bay and its tributaries by managing nutrient and sediment pollution.⁹⁰ To protect the Bay, the CBPA requires jurisdictions to enact ordinances that restrict land use and development in Chesapeake Bay Preservation Areas. Chesapeake Bay Preservation Areas consist of Resource Protection Areas (RPAs) and Resource Management Areas (RMAs).⁹¹ RPAs require waterfront landowners to maintain a vegetated buffer reaching inland 100 feet from the water. Jurisdictions have more discretion in setting RMAs; they consist of lands that reach further inland, such as a floodplain.⁹² If a locality bans development in the buffer, it is eligible for credit.

The CBPA requires locations within Tidewater Virginia are required to regulate land-disturbing activities that are equal to or greater than 2,500 square feet in areas that are subject to preservation area designation and management regulations.⁹³ Localities will vary in the amount of land that falls under a preservation area designation. **A locality is awarded 90 credits if all development is regulated except for increases of impervious area of 5,000 square feet or less.⁹⁴ Therefore, localities in Tidewater, Virginia have the potential to receive more credits than other localities.** Under the CBPA civil penalties are an enforcement *option*.⁹⁵ If jurisdictions do not enforce or do not have enforcement provisions in place, they will not earn credit. Open space credit may also be available also, which is discussed later in this paper.

Sub-Element (2): Design Storm

The design storm sub-element can generate a maximum of 225 credits.⁹⁶ For design storm credit, the community must require management of at least a ten-year storm.⁹⁷ The community's regulations must require pre- and post-development hydrology calculations and must limit post-development runoff to pre-development levels. Maximum Credit is awarded for floodplain management regulations that are based on the 100-year storm and that state that all discharges up to and including that from the 100-year storm must be released at rates not exceeding the pre-development peak discharge. Additional credit may be awarded when the regulations require retention of runoff.⁹⁸

Design Storm Credit Opportunities

Minimum Requirements:

1. Community must require management of at least a 10-year storm.
2. Community's regulation must require pre- and post-development hydrology calculations and post-development runoff must be limited to pre-development levels.⁹⁹

DS= the total of the following for the storms used to measure the impact of the new development. If the volume of runoff is controlled by retaining the runoff on site, infiltrating the runoff, or ensuring that the volume of runoff during all storms greater than half of the 2-year event remains constant, the credit is increased by 50%.¹⁰⁰

DS1: 10-year storm	EITHER 14 credits OR 21 credits , if the volume is also controlled.
DS2: Larger than 10-year storm but smaller than 100-year storm	EITHER 36 credits OR 54 credits , if the volume is also controlled.
DS3: 100-year storm	EITHER 100 credits OR 150 credits , if the volume is also controlled.

Under the VSMA, the SWCB has authority to develop regulations for the Virginia Stormwater Management Programs.¹⁰¹ The SWCB established minimum criteria that both DEQ-administered and locality-run VSMP programs must follow.¹⁰² Each locality's VSMP authority must incorporate enforcement provisions from a list of options provided by the SWCB.¹⁰³ The localities must include informal and formal administrative enforcement procedures such as verbal warnings and inspection reports AND civil and criminal enforcement procedures.¹⁰⁴ The locality's VSMP has the discretion to impose a maximum penalty of \$32,500 per violation per day.¹⁰⁵ While the localities have enforcement authority, the SWCB also retains the authority to enforce provisions of the Stormwater Management Act and its regulations.¹⁰⁶

The regulations require predevelopment and post-development runoff characteristics and hydrology to be verified by site inspections, topographic surveys, studies, and calculations.¹⁰⁷ The design storms cited in the regulations are the one-year, two-year, and 10-year 24-hour storms.¹⁰⁸ The regulations credit, but do not require volume reduction.¹⁰⁹ The only way localities could get credit for volume reduction is if they develop a more stringent ordinance. Site designers may use the Virginia Runoff Reduction Method to reduce the overall volume of runoff that leaves a site.¹¹⁰ Communities receive 14 credits if detention is designed for a 10-year storm

and 21 credits if the volume is also controlled. **Therefore, communities should receive at least 14 credits out of 225 because the SWCB-developed regulations for VSMPs that require consideration of the 10-year design storm. If communities control volume under the regulations, they should earn 21 credits. Communities could exceed Virginia minimum requirements and earn up to 150 credits.**

Sub-Element (3): Low Impact Development

Communities that require development projects to implement LID can receive up to 25 CRS credits.¹¹¹ LID incorporates green infrastructure such as rain gardens, vegetated rooftops, and rain barrels to reduce the impact of built areas and promote the natural movement of water within a watershed.¹¹² Not only can green infrastructure filter stormwater, it improves quality of life, contributes to community involvement, and has aesthetic benefits.

LID Credit Opportunities	
Minimum Requirement: Regulatory language requires the implementation of LID techniques when new development occurs. ¹¹³	
Community requires new development and redevelopment to use LID in all cases.	25 credits awarded
Community's stormwater management ordinance requires the use of "soft" techniques that mimic natural hydrologic runoff to reduce runoff to the maximum extent possible before using detention. Developers are required to control the runoff.	Additional credit provided
A community can receive partial credit for a stormwater management ordinance that requires all development (except single-family residences) minimize runoff using "soft" techniques. ¹¹⁴	

The VSMA regulations encourage LID designs.¹¹⁵ The regulations provide a list of best management practices (BMPs) that are approved to reduce the phosphorus load and runoff volume in accordance with the Virginia Runoff Reduction Method.¹¹⁶ The Reduction Method was created to ensure that the BMPs actually reduce overall runoff volume and remove pollutants, and the method incorporates incentives for LID, such as preserving forests and reducing soil disturbances and impervious cover.¹¹⁷ Developers reduce the treatment volume when they maximize forest and open space because they use natural systems to filter stormwater. The list of BMPs that localities can choose from includes vegetated roofs and bioretention.¹¹⁹ While the stormwater regulations encourage and incentivize runoff reduction BMPs through the use of the runoff reduction method, traditional BMPs are still allowed and are assigned a pollutant removal efficiency.¹²⁰ It is likely that a locality may only get LID credit if it adopts an ordinance that only allows the LID BMPs to be utilized for compliance with the regulations. Because VSMP authorities have the authority to establish limitations on the use of specific BMPs, the credits generated will vary among localities based on which BMPs they decide to incorporate. **Localities can generate up to 25 credits depending on the BMPs implemented.**

Sub-Element (4): Inspection and Maintenance

Communities can receive a maximum of 20 credits for incorporating inspection and maintenance provisions in their ordinances.¹²¹ There are three ways a community can generate credit.¹²² Under the first approach, a community must require that the owners of all stormwater management facilities constructed after the adoption of the regulation have the facilities inspected by a licensed professional engineer and perform any recommended maintenance. The owners must provide the community a copy of the inspection reports and documentation of the maintenance performed. The community must have the authority to perform the inspection if the owner fails to do so and to order the owner to complete maintenance.¹²³ In the alternative, the community can complete the maintenance and compel the owner to pay for the work performed. The second approach is for the community to require the owners of facilities to allow the community to inspect their facilities. The owners must perform necessary maintenance. If the owners fail to complete the maintenance, the community must have the authority to perform the maintenance and bill the owner for the work.¹²⁴ The final approach is for the community to require all stormwater management facilities constructed after the regulations are adopted to be deeded to the community (or other stormwater management agency).¹²⁵

Inspection and Maintenance Credit Opportunities Minimum Requirement: Inspection and maintenance of stormwater management facilities must be required. ¹²⁶	
<p>If the community adopts 1 of these 3 approaches:</p> <ul style="list-style-type: none">(1) The community requires that, at least once each year, the owners of all stormwater management facilities constructed after the date of adoption of the regulation have the facilities inspected by a licensed professional engineer and perform any maintenance recommended by the engineer(2) The community requires the owners of all new facilities to allow the community to inspect their facilities. If problems are found, the owners must perform the necessary maintenance. If the owner fails to perform the required maintenance, the community (or agency) must have the authority to perform the maintenance and bill the owner for the work performed(3) The community requires all stormwater management facilities constructed after the date of adoption of the regulation (including basins built by private developers) to be deeded to the community (or other stormwater management agency) <p>Which ever approach is used, it must be supported by an ordinance or other regulatory authority. There needs to be clear legal authority.¹²⁷</p>	20 credits

The Virginia stormwater regulations mandate that VSMP authorities require the provision of long-term responsibility for and maintenance of stormwater management facilities. The requirements must run with the land, provide for all necessary access for purposes of maintenance and regulatory inspections, provide for inspections and maintenance and submission of inspection and maintenance reports to the VSMP authority, and be enforceable by all appropriate governmental parties.¹²⁸ The VSMP

authority's inspection program requires post-development inspection programs, which shall be approved by the board, ensure that each facility is inspected at least once every five years, and be documented by records.¹²⁹ The inspection program can use inspection reports of the owner of a stormwater management facility if the inspection is conducted by a person who is licensed as a professional engineer, architect, landscape architect, or land surveyor; a person who works under the direction and oversight of the licensed professional engineer, architect, landscape architect, or land surveyor; or a person who holds an appropriate certificate of competence from the board.¹³⁰ Violations of the regulations, including the failure to conduct required inspections or incomplete, improper, or missed inspections, can result in a maximum penalty of \$32,500 per violation per day.¹³¹ **Localities should receive full credit of 20 credits for the inspection and maintenance provisions of the VSMP.**

Stormwater Funding Available in Virginia	
Stormwater Local Assistance Fund ¹³²	<p>Administered through DEQ, this fund provides matching grants to local governments for the planning, design, and implementation of stormwater BMPs that address cost efficiency and commitments related to reducing water quality pollutant loads.</p> <ul style="list-style-type: none"> · Minimum of \$100,000 grant and maximum of \$5 million · Project must have at least \$200,000 in eligible costs · Recipient must be able to demonstrate availability of 50% local match · Stormwater Local Assistance Fund (SLAF) program allows grants to cover "reasonable and necessary" costs associated with the stormwater project
VA Clean Water Revolving Loan Fund (VCWRLF) Stormwater Loan Program ¹³³	<p>Low interest loans may be made from this fund to construct facilities or structures or implement best management practices that reduce or prevent pollution associated with stormwater runoff</p> <ul style="list-style-type: none"> · Financing only available in fiscal years when loan requests for eligible wastewater treatment facilities have been satisfied
VA Pooled Financing Program ¹³⁴	Provides funding to local governments for essential projects
Combined Sewer Overflow Matching Fund ¹³⁵	<p>Matches federal money for purposes of providing grants to localities for Combined Sewer Overflow (CSO) projects</p> <ul style="list-style-type: none"> · Sums appropriated by the General Assembly · Administered/managed by the Virginia Resources Authority with direction from the SWCB

Watershed Master Planning

Another opportunity for credit under CRS 450 provides localities an opportunity to earn up to 315 CRS credits if they adopt a Watershed Master Plan.¹³⁶ The master plan must evaluate future conditions and long-duration storms, identify wetlands and natural areas, address the protection of natural channels, and provide a dedicated funding source for implementing the plan.¹³⁷ For CRS credit, a Watershed Master Plan must address the regulatory standards for new development. In addition, the plan must manage future peak flows so that they do not increase over present values and must require management of runoff from all storms up to and including the 25-year event.¹³⁸

Watershed Master Plan- Credit Criteria	
1.	The community must have adopted a watershed master plan for one or more of the watersheds that drain into the community, and the plan must identify the natural drainage system and constructed channels
2.	The community must have adopted regulatory standards that are based on the plan and that receive credit under SMR in section 452.a
3.	The plan's regulatory standards must manage future peak flows so that they do not increase over present values
4.	The plan's regulatory standards must require management of runoff from all storms up to and including the 25-year event
5.	For any plan that is more than 5 years old, the community must evaluate the plan to ensure that it remains applicable to current conditions. The evaluation must address whether the data used for the plan are still appropriate and whether the plan effectively manages stormwater runoff. The community must update a watershed master plan that becomes obsolete, or the WMP credit will be revised accordingly.
6	WMP1 credit (see CRS Coordinator's Manual) must be received in order to receive credit for any of the other items
Source: CRS Coordinator/s Manual 450-15.	

It is unlikely that compliance with the VSMA would generate credit for this activity; however, Watershed Implementation Plans under the Bay TMDL, plans for implementing MS-4 permits, or other regional efforts may meet some of the criteria. Virginia has already submitted a Phase I and Phase II Watershed Implementation plan to the Environmental Protection Agency which identifies the measures Virginia is putting in place to achieve nutrient reductions as part of the Bay restoration effort.¹³⁹ The MS4 general permit that became effective on July 1, 2013, requires the MS4 to develop Chesapeake Bay TMDL and local TMDL action plans.¹⁴⁰ DEQ is currently working on guidance for the TMDL action plans.¹⁴¹ The action plans are required to identify the BMPs and other milestone activities that the MS4 will implement during the term of its permit.¹⁴² CRS officials should strongly consider these action plans as possible sources of credit. Localities should be aware that regional cooperation, such as the efforts of planning commissions like the Hampton Roads Planning District Commission, might generate credits and actively seek credit.

Erosion and Sediment Control

Erosion and sediment control activities can generate a maximum of 40 CRS credits under Section 450.¹⁴³ The community must apply erosion and sediment control regulations to all construction sites within the community. The number of credits generated varies depending on the size of the disturbed land that is regulated. A community receives 40 credits if regulations control soil loss from any disturbed land greater than 1,000 square feet; 30 credits if regulations control erosion and soil loss from disturbed land greater than 0.5 acres; and 10 credits if regulations control erosion and soil loss from disturbed land greater than 1 acre.¹⁴⁴

Erosion and Sediment Control Credit Opportunities Minimum Requirements: Community's regulations must apply to all construction sites within the community. An erosion and sediment control regulation that is part of a floodplain ordinance or a building code and does not affect ALL construction sites in the community does not receive credit. ¹⁴⁵	
If regulations control erosion and soil loss from any disturbed land greater than 1,000 square feet ¹⁴⁶	40 credits
If regulations control erosion and soil loss from any disturbed land greater than 0.5 acre	30 credits
If regulations control erosion and soil loss from any disturbed land greater than 1 acre	10 credits

Under the VMSA, developers must provide SWPPs, which must include an approved erosion and sediment control plan that is consistent with the Virginia Erosion and Sediment Control regulations under the Virginia Erosion and Sediment Control Law. Prior to land disturbance, the VSMP authority must approve the plan, and it must be designed and implemented during construction activities.¹⁴⁷ The Virginia Erosion and Sediment Control Law applies to land-disturbing activities of 10,000 square feet or more (0.23 acres).¹⁴⁸ **Therefore, all localities should receive 30 credits if they comply with the erosion and sediment control portions of the VSMA. All localities in Virginia currently receive Uniform Minimum Credit of 30 credits.**

Water Quality

Water quality management can generate up to 20 credits under Section 450.¹⁴⁹ To receive credits, the community's stormwater management regulations must either specify one or more measures or refer to BMPs as published in an official government reference.¹⁵⁰ This approach is designed to credit BMPs that are permanently incorporated into the development's stormwater management facilities, not for BMPs required only during the course of construction.

Water Quality Credit Opportunities Minimum Requirements: Community's stormwater management regulations must specify one or more measures or refer to BMPs as published in an official government reference ¹⁵¹	
If regulations require new developments of one or more acre to include in the design of their stormwater management facilities appropriate BMPs that will improve the quality of surface water. ¹⁵²	20 credits

On July 1, 2014, the *Virginia Stormwater Management Handbook* incorporated changes to the Virginia Stormwater BMPs.¹⁵³ Currently, the BMP Clearinghouse lists approved stormwater BMPs.¹⁵⁴ The regulations provide a list of approved BMPs to reduce the phosphorus load and runoff volume in accordance with the Virginia Runoff Reduction Method.¹⁵⁵ These BMPs include infiltration, swale, and bioretention, which improve the quality of the stormwater before it reaches receiving waters.¹⁵⁶ The new regulations limit the phosphorus load to 0.41 pounds per acre per year in order to achieve no net increase in nutrients for new development and there are also limits on redevelopment.¹⁵⁷ **Localities can generate up to 20 credits for water quality under the Virginia Stormwater Management Program.**

Virginia Uniform Minimum Credit

The CRS program awards uniform minimum credit (UMC) for state mandated laws and regulations, administered and enforced at the state level, that aid in floodplain management and reduce flood damage.¹⁵⁸ UMC credit is only available for CRS eligible credit; credit generating activities enforced at the state level must go above and beyond the minimum requirements of the NFIP. UMC credits are divided into actual UMC credit and “possible” UMC credit. Virginia currently receives 30 credits under Section 450 for erosion and sediment control and 20 credits for water quality.¹⁵⁹

Because compliance with Virginia’s new Stormwater Management Act should generate 169 CRS credits for localities participating in the CRS program,¹⁶⁰ Virginia’s UMC should accurately reflect the new stormwater management regulations.

Activity 420: Open Space

Open space preserved in the floodplain is an important way that a community also can earn CRS credits. These credits translate into flood insurance discounts from 5% to 45%. Open space can provide up to 2,020 credits,¹⁶¹ although currently the average Virginian community earns only 138 credits in the open space category.¹⁶² A great opportunity exists for Virginians to capitalize on available open space credits as well as encourage further open space preservation in the floodplain.

Indeed, localities are already complying with Virginia statutes and regulations that promote open space preservation as well as participating in land-preservation programs, including the CBPA, the Tidal Wetlands Act, the Coastal Primary Sand Dunes and Beaches Act (SD&BA), the Open Space Land Act and the Virginia Conservation Easement Act. If a community contains land that falls under any of these acts, that land will likely earn CRS credit. The specific potential for CRS credits in these statutes, regulations and programs is detailed further in the figure that follows. By participating in CRS, a community can lower the flood insurance premiums paid by homeowners and businesses, mitigate the risk of food damage, educate its members on smart flood planning, and preserve natural habitats.

Minimum Criteria For Open Space Preserved in the Floodplain

A community must meet four major criteria in order to receive credits for open space that has been preserved in the floodplain. This category can earn a community up to 1,450 credits. The total number of credits is calculated based upon the percentage of a community’s floodplain that is preserved, as compared to the percentage that is developed. The land must:

1. **Be located in the floodplain.** The land must be located in the SFHA or an area with similar flood-mitigating regulations.
2. **Contain no buildings.** There cannot be any insurable buildings in the open space. Pavilions, gazebos, bleachers, and tractor sheds are permitted. Additionally, if the land is more than ten acres, a building that is a necessary for the use of the land—such as a farmhouse on farmland—is permitted.
3. **Not be filled or used to store materials.** The land cannot be filled or used for the storage of materials. However, activities such as plowing, sand dune construction, beach nourishment, and repairing flood levees are permitted.
4. **Preserved as open space.** The parcel must be preserved as open space, either because it is public land, owned by a private nature preserve, or regulated so as to prevent building, filling, and storage of materials.¹⁶³ Many localities have already incorporated several state statutes that could qualify open space land for credits because it is regulated in a manner that preserves open space.

Steps for Credit for Open Space Preserved in the Floodplain

Minimum Criteria. Open land that, at a minimum, is preserved in the floodplain with restrictions on building and filling to qualify for open space credit. Additional points are available for:

Natural Functions or Natural Shoreline. If the open space land that meets the minimum criteria also retains its natural functions or natural shoreline, additional points will be awarded.

Preserved in Perpetuity. If the open space land that meets the minimum criteria also is preserved in perpetuity with a deed restriction, even more points are possible.

or

Flood Smart Growth. Even if development is not completely prohibited on land in the floodplain and therefore does not meet the minimum requirements described above, a community can still earn credits from land use regulations in the floodplain. A community may earn credits by enacting a low density zoning ordinance in the floodplain and zoning the land with five-acre lot sizes. A community that works with developers to encourage planned unit developments, setbacks and greenways, and building outside of the flood zone will also garner points.

Beyond the Minimum: Deed Restrictions, Natural Functions, and Natural Shoreline

Once land first qualifies as open space because it meets all four criteria above, that same land may qualify for additional credits if it has one (or more) of the following characteristics:

1. **Deed Restrictions.** A deed restriction is worth up to 50 additional credits. To qualify, the land must contain a restriction in the deed prohibiting new buildings on the land, the deed restriction must transfer to future owners, and the deed restriction can only be amendable by a court for just cause. When properties are purchased with funds from FEMA's mitigation grant programs, these properties count because FEMA requires such a deed restriction.¹⁶⁴
2. **Natural Functions Preserved.** Open space land that preserves the land's natural functions can earn the community up to an additional 350 credits. To qualify, the land must either be in an undeveloped state, or have been restored to a natural state. This could be land that has been acquired by the Virginia Outdoors Foundation (VOF) for "natural" reasons (as opposed to scenic or historic reasons), or has been acquired by the Nature Conservancy's Heritage Program Inventory. Additionally, if the land is designated as critical habitat for an endangered or threatened species or as an open space corridor, then credits can be earned. If educational materials are placed along a trail, then this activity can be credited under Activity 330.¹⁶⁵
3. **Natural Shoreline Protection.** Open space land that provides natural shoreline protection can earn the community up to an additional 120 credits. For public land, regulations or a stated community policy that allow for channels and streams to follow their natural process, such as meandering and beach erosion, will qualify for additional credit.¹⁶⁶ In riverine areas, rip rap or armoring, channel alterations, dredging, filling, grubbing, and removal of vegetation must be prohibited by regulation or program policy. On shorelines, filling or beach alterations, including beach nourishment, alterations to sand dunes, construction

of seawalls, bulkheads, armoring, or other shoreline stabilization structures must be prohibited by regulation or program policy. The removal of a levee, restoring natural habitat, and planting to preserve dunes is permitted. Importantly, federally owned lands do not count towards any open space credit, so a U.S. Fish & Wildlife Nature Reserve will not count, even if located within the community's floodplain.

Restoring Natural Functions: Local Examples from Virginia

Programs instituting living shorelines, wetlands restoration, and stream restoration may exist in a community. If these programs are in the floodplain and are regulated or owned in a way that preserves the open space, CRS credits may be earned. Additionally, if they preserve the land's natural functions or provide natural shoreline protection, additional CRS may be earned.

Many groups are already working to clean up, re-plant and restore Virginia's shoreline and riverine natural habitats. **The Elizabeth River Project**, for example, is working to restore a Chesapeake Bay tributary, the Elizabeth River. In partnership with the Virginia Port Authority, for one project they restored eleven acres of tidal wetlands and set up nature trails and a park, Paradise Creek Nature Park, along the Elizabeth River. You can read more about it at: <http://www.elizabethriver.org>.

Meanwhile, the **Virginia Institute of Marine Science** will consult with those planning to plant a living shoreline or restore wetlands or a riverbed to ensure that the habitat is planted in an ecologically sound way that preserves natural functions. Further information is available at <http://ccrm.vims.edu/livingshorelines/index.html>.

Flood Smart Growth: Land Not Meeting Minimum Criteria May Qualify for Credit in Other Ways

Even if land in the floodplain is not preserved as open space, the community can provide incentives for flood smart growth that will earn open space CRS credits. A community might adopt measures that encourage less development and/or low density zoning to encourage open space preservation.

Measures that Encourage Less Development

Open space incentives can earn a community an additional 250 credits. A community can encourage less development in the floodplain at the planning and zoning level. For example, requiring a reduced proffer fee or impact fee when developers avoid floodplains, requiring Planned Unit Developments and cluster developments, and requiring greenways and setbacks are all measures that would help to mitigate potential flood problems. Building houses close together is both economically efficient for the developer, because it shortens the distance that utilities and roads must be run, and for the community, by shortening the roads that must be maintained and plowed.¹⁶⁷ Credits are also awarded in this category for a program that provides tax incentives to keep land open, such as keeping farmland tax rates low when an open space easement is in place. Additionally, a community comprehensive plan that recommends open space or low density uses in the floodplain is another smart growth incentive that will qualify for credit.

Low Density Zoning

A community can earn up to 600 credits in this category. Land that does not qualify for open space credits may qualify for low density zoning credits in this category.

The qualifying area must be zoned with lot sizes of at least five acres. Agricultural, conservation, or large residential lots are all permitted uses, so long as the five-acre lot size is met. If a community has open land zoned in this manner, or has land developed in conformity with low density zoning, that land can count towards low density zoning credits.

USING ZONING TOOLS TO EARN CRS CREDIT

In *Using Zoning Tools to Adapt to Sea Level Rise*, former VCPC student Barb Marmet outlines, using the City of Poquoson as a case study, the different ways in which a Virginia locality may consider using zoning tools to reduce flooding and protect public safety. The report also explores difficulties localities may face when trying to adopt some of these measures. Some of the key points from the report include:

- Comprehensive – as opposed to piecemeal -- “downzoning” limiting the density or types of development is likely permissible under Virginia law. In contrast, downzoning affecting a small area can only be justified by fraud, mistake, or a change in circumstances.
- Virginia’s protections for existing nonconforming uses would significantly limit the effect of a comprehensive downzoning, as many at-risk properties may already be developed.
- Where change is not possible through zoning ordinances, cities may still update their floodplain regulations to implement adaptive building standards on structures damaged by floods.

The report is available on VCPC’s website at <http://law.wm.edu/academics/programs/jd/electives/clinics/vacoastal/documents/march2014reports/zoningtools.pdf>

Potential Open Space Credits Earned by Complying with Virginia Statutes

Many localities already comply with various state statutes, including the CBPA, Tidal Wetlands Act, SD&BA, Open Space Land Act, and Virginia Conservation Easement Act. Compliance with these state statutes is likely to result in open space, and this open space can earn a community open space CRS credit.

Virginia Laws and Regulations -- Open Space Credit Potential

Chesapeake Bay Preservation Act (CBPA)¹⁶⁸

Open Space Preservation <i>Up to 1,450 credits</i>	The CBPA requires a 100-foot wide buffer area landward of Chesapeake Bay waters, called the "Resource Protection Area." Reg. 9 VAC 25-830-140(1) limits land development within the RPA to water dependent activities, redevelopment, zoned Intensely Developed Areas, permitted encroachments, certain roads, or flood control facilities. If the community restricts development in the RPA, that open space can count towards Open Space Preservation credits because it is regulated to preserve open space. ¹⁶⁹
Natural Functions Open Space <i>Up to 170 credits</i>	The CBPA explains that in order to maintain the functional value of the buffer area, existing vegetation in the RPA can only be removed to preserve sight lines, paths must be designed to control erosion; dead, diseased or noxious weeds such as Kudzu can be removed, and shoreline erosion projects can be undertaken. If the community preserves the RPA's natural functions, it can count towards Natural Open Space credits. ¹⁷⁰
Natural Shoreline Protection <i>Up to 120 credits</i>	The CBPA explains that preserving the RPA provides for the removal, reduction, or assimilation of sediments, and states that the RPA shall include tidal wetlands, nontidal wetlands connected by surface flow, tidal shores, and a 100 ft. buffer area. If a locality enforces this regulation, the natural shoreline will be preserved and the land can count towards Natural Shoreline Protection credits. ¹⁷¹
Open Space Incentives <i>Up to 250 credits</i>	The CBPA Intensely Developed Areas allows areas of existing development and infill sites where little natural environment remains to be designated as a redevelopment area. Open Space Incentive 422e-OSI5 provides credits for regulations that allow cluster development, such as an Intensely Developed Area. ¹⁷²

Tidal Wetlands Act¹⁷³

Open Space Preservation <i>Up to 1,450 credits</i>	If the wetlands board has preserved lands in the floodplain, the land may qualify for open space preservation credits, because the open space is preserved under the Tidal Wetlands Act regulations. VA Code Ann. § 28.2-1308(A)(1) states that, in considering whether a permit is granted, "[w]etlands of primary ecological significance shall not be altered so that the ecological systems in the wetlands are unreasonably disturbed...."
Natural Functions Open Space <i>Up to 170 credits/ Natural Shoreline Protection 120 credits</i>	If the parcel qualifies as open space, it will likely also qualify for Natural Functions Open Space (170 credits) because the land has preserved due to its status as a productive wetland. Additionally, if it is a tidal wetland that is preserved, it may qualify for Natural Shoreline Protection (120 credits) because of the function tidal wetlands serve in protecting shorelines.

Coastal Primary Sand Dunes and Beaches Act (SD&BA)¹⁷⁴

Open Space Preservation <i>Up to 1,450 credits</i>	If the wetlands board has preserved land in the floodplain, including sand dunes, it may qualify for open space preservation credits. The land can count for credit because the open space is preserved under a regulation, the SD&BA (and any local corresponding ordinance). If the local wetlands board adheres to the Act and preserves open space by not permitting the leveling of sand dunes, then building and filling would not occur.
Natural Functions Open Space <i>Up to 170 credits/ Natural Shoreline Protection 120 credits</i>	If the parcel qualifies as open space, it will likely also qualify for Natural Functions Open Space (170 credits) and especially for Natural Shoreline Protection (120 credits) . VA Code Ann. § 28.2-1408 states that "[n]o permanent alteration of or construction upon any coastal primary sand dune shall take place which would (i) impair the natural functions of the dune, (ii) physically alter the contour of the dune, or (iii) destroy vegetation growing thereon unless the wetlands board... determines that there will be no significant adverse ecological impact, or that the granting of a permit is clearly necessary and consistent with the public interest...." If the wetlands board does not permit alteration or construction on sand dunes, the natural shoreline protection that the dunes provide will remain intact, and qualify for credit. However, if there is beach renourishment, then the land will not qualify for the additional "natural" credits.



Open Space Land Act ¹⁷⁵ and Virginia Conservation Easement Act ¹⁷⁶	
Open Space Preservation <i>Up to 1,450 credits</i>	Actual land preserved in the floodplain via an open space easement will also count towards Open Space Preservation if the easement prohibits building and filling. Under the Open Space Land Act Va. Code Ann. § 10.1-1700, any county or municipality, or a state entity such as the VOF may hold the open space easements. Also, under the Virginia Conservation Easement Act, many land trusts have been set up in Virginia, which would likely also qualify for open space credit. Depending upon the type of easement (agricultural or conservation), and use and location of the land, the open space land may qualify for Natural Shoreline or Natural Functions credits in addition to open space credits.
Open Space Incentives <i>Up to 250</i>	Open Space Incentive credits (422.e-OSI6) are provided for a program that provides tax incentives to keep land open, such as keeping farmland tax rates low when the owner signs an agreement not to develop. Va. Code Ann. § 10.1-1011 states that where a perpetual easement is held pursuant to the Virginia Conservation Easement Act or under the Open Space Land Act, the owner and the holder of the easement shall not be taxed at the state or local level, except at the tax rate of open space. If a locality conforms to these regulations by providing tax incentives at the local level, then it can count this towards Open Space Incentive credits.

Potential Open Space Credits Earned by Participating in Virginia Programs

Many localities participate in voluntary land preservation programs or have property within their jurisdictions that is managed by land conservation organizations. The VOF, the Nature Conservancy, and Virginia land trusts such as the Pediment Environmental Council, Land Trust of Virginia, Blue Ridge Land Conservancy, National Committee for the New River, Potomac Conservancy, and Virginia Eastern Shore Land Trust may well have preserved property that counts for CRS credit under Activity 420. Wetlands mitigation activities could similarly generate CRS open space and natural preservation credits.

Virginia Programs - Open Space Credit Potential

Virginia Outdoors Foundation. Created by the Virginia General Assembly in 1966,¹⁷⁷ VOF promotes the preservation of open-space lands in the Commonwealth.

Open Space Preservation Incentives <i>Up to 1,450 credits</i>	Open Space Incentive Credit (422.e-OSI6) is provided for a program that provides tax incentives to keep land open, such as keeping farmland tax rates low when the owner signs an agreement not to develop.
Open Space Preservation 1,450 credits	Open space easements held by the VOF can count towards a community's open space credits. The land that the VOF holds the easement for must 1) be located in the floodplain 2) prohibit filling, although plowing is permitted, and 3) prohibit the construction of buildings. One building, whose use is necessary to maintain the land, is permitted so long as the parcel is greater than 10 acres. If the parcel was accepted by VOF for agricultural preservation purposes, it can qualify for open space credit credits so long as the above requirements are met. NOTE: A parcel must qualify for open space credits under this section to be eligible to qualify for any of the subsequent credits listed in this section.
Natural Functions Open Space 170 credits	If the parcel was accepted by VOF for natural reasons - because there is little land disturbance and vegetation clearing, or the land provides habitat for threatened or endangered species, is a wetland, or is a riparian corridor, ¹⁷⁸ then the land can qualify for Natural Functions Open Space in addition to Open Space credits.
Natural Shoreline Protection <i>Up to 120 credits</i>	If the parcel was accepted by VOF for natural reasons and is located along a shoreline, then the land can qualify for Natural Shoreline Protection credits.
Deed Restriction 50 credits	The VOF requires the open space easements it holds to contain deed restrictions. So long as the deed restriction states that 1) no new buildings may be erected 2) the restrictions are transferable to subsequent property owners, and 3) the restriction can only be amended by a court for just cause, then the parcel can qualify for deed restriction credits in addition to the open space credits it earns.

Nature Conservancy - Heritage Program Inventory¹⁷⁹

Open Space Preservation <i>Up to 1,450 credits</i>	Through the Virginia Natural Area Preserves Act § 10.1-209, the Department of Conservation and Recreation works with the Nature Conservancy to identify and acquire biologically significant natural areas. This land is added to the Virginia Natural Area preserves, and is usually owned by DCR, although it may also be owned by the Nature Conservancy, universities and private individuals. Land acquired through this program that is in a floodplain, cannot be built on or filled in, and is preserved as open space can qualify for open space credits. Ownership by DCR or the Nature Conservancy will evidence "preservation" as open space, but ownership by a university or private person is more problematic unless clear restrictions, such as a deed restriction, are in place. Credit is provided if the parcel is designated as critical habitat for threatened or endangered species, or is a designated open space corridor or connected network. Land acquired under this program is likely to qualify for Natural Functions Open Space credits.
Natural Functions Open Space <i>Up to 170 credits</i>	

Virginia Land Trusts	
Preservation <i>Up to 1,450 credits</i> Natural Functions Open Space <i>Up to 170 credits</i>	<p>Under the Virginia Conservation Easement Act, various entities can set up land trusts. If the open space land is in the floodplain, building and filling is prohibited, and the trust ensures building will not occur in the future, the land can qualify for open space credit. It may also qualify for natural functions open space or natural shoreline protection, depending on the use and location of the land held in trust. Major land trusts in Virginia include the Pediment Environmental Council, Land Trust of Virginia, Blue Ridge Land Conservancy, National Committee for the New River, Potomac Conservancy, and Virginia Eastern Shore Land Trust. A complete list can be found at: http://findalandtrust.org/states/virginia51/land_trusts#statewide.</p>
Wetlands Mitigation Banking	
Open Space Preservation <i>1,450 credits</i> Natural Functions Open Space <i>170 credits</i> Natural Shoreline Protection <i>120 credits</i>	<p>In order to comply with the Clean Water Act §404 Compensatory Mitigation Requirements, developers may purchase wetlands in another location to mitigate the impact of construction on wetlands. If a community has a wetlands bank in their floodplain, and that land is preserved as open space, it may qualify for:</p> <p>Land acquired through this program that is in a floodplain, cannot be built on or filled in, and is preserved as open space can qualify for open space credits. Open space credit may only be earned where the bank is located, and the bank must be owned by a private company, a non-profit, or the state with a policy of preserving the land.</p> <p>Credit may be provided where the bank preserves the natural functions of the wetlands or where the wetland bank is located along a shoreline. A list of mitigation banks in Virginia is available here: https://rsgisias.crrel.usace.army.mil/ribits/f?p=107:158:12223120180421::NO:RP:</p>

Conclusion

Flooding in Virginia is a serious problem that has cost many millions of dollars in damage; it is predicted to get worse.¹⁸⁰ Virginia has 114,247 flood insurance policies in force, which have combined premiums of \$75,718,135.¹⁸¹ CRS is a way for Virginians to lower their flood insurance premiums and to lower their risk of flood damage. The CRS program encourages smart flood development by rewarding stormwater management, LID, parks, recreational fields, conservation, trails and agriculture in the floodplain, and encouraging wetlands that lower the velocity and frequency of floods. It also incentivizes developers to take advantage of setbacks, PUDs, and large lot sizes. Many communities have already recognized the importance of improved stormwater management and preserving open space in the floodplain, and can receive credit for existing programs. Taking advantage of the CRS program provides substantial benefits - to the homeowner, to the community, and to the environment.

• **Appendix A: Detailed Description of How Compliance with**
 • **the VA Stormwater Management Act Generates CRS Credit**
 •

SECTION 450: STORMWATER ACTIVITIES (775 credits total)		
Stormwater Management Regulations (SMR)		
Sub-Element	Source of Credit	Estimated Credits
Size of Development	<p>CRS Requirements: the community must regulate, at a minimum, parcels of 5 acres or more or increases in impervious area of 20,000 sq. ft. or more.</p> <ul style="list-style-type: none"> • 110 credits if all development is regulated • 90 credits if all development regulated except parcels of 1/2 acre or less or increases in impervious area of 5,000 sq. feet • 60 credits if development regulated except parcels of 1 acre or less • 15 credits if development regulated except for parcels of 5 acres or more <p>Source: CRS Coordinator's Manual 450-5 and 450-6.</p>	
Max Credits: 110	<p>VA Stormwater Management Act/VSMP: VSMA regulates land-disturbing activities that disturb more than 1 acre of land.</p> <p>Source: Va. Code § 62.1-44.15:28(5); Va. Code§ 62.1-44.15:34(C)(4); VA Stormwater Management Model Ordinance Sec. 1-3(c)(3)-(4).</p>	60 credits
	<p>Chesapeake Bay Preservation Act: Locations within Tidewater Virginia are required to regulate land disturbing activities that are equal to or greater than 2,500 sq. ft. in areas that are subject to preservation area designation and management regulations</p> <p>Source: Va. Code §62.1-44.15:34(C)(4).</p>	Up to 90 credits
Size of Development	<p>CRS Requirements: Community must require management of at least a ten-year storm. Regulations must require pre- and post-development hydrology calculations and post-development runoff must be limited to pre-development levels. DS = the total of the following for the storms used to measure the impact of the new development:</p> <ul style="list-style-type: none"> • DS1= EITHER 14 credits, if detention is designed for a 10-year storm, OR 21 credits, if the volume is also controlled. • DS2= EITHER 36 credits, if detention is designed for a storm larger than the 10-year but smaller than the 100-year storm, OR 54 credits, if the volume is also controlled. • DS3= EITHER 100 credits, if detention is designed for the peak flow of the 100-year storm, OR 150 credits if the volume is also controlled <p>Source: : CRS Coordinator's Manual 450-7 and 450-8.</p>	
Max Credits: 225	<p>VA Stormwater Management Act/VSMP: The land-disturbing activities regulations should be designed to reduce the allowable peak flow rate resulting from a 10-year, 24-hour storm to a level that is less than or equal to the peak flow rate from the site assuming it was in good forested condition.</p> <p>The design storms cited in the regulations are the one-year, two-year, and 10-year 24-hour storms. The regulations require pre-development and post-development runoff characteristics and hydrology to be verified. The regulations credit, but do not require volume reduction.</p> <p>Sources: 9 Va. Admin Code § 25-870-66(F); 9 Va. Admin Code § 25-870-72(A).</p>	<p>Low Impact Development</p> <p>Max credits: 25</p>

Sub-Element	Source of Credit	Estimated Credits
Low Impact Development Max credits: 25	<p>CRS Requirements: Regulatory language requires the implementation of LID techniques when new development occurs.</p> <p>Source: CRS Coordinator's Manual 450-8.</p>	
	<p>VA Stormwater Act/VSMP: The VSMA regulations provide a list of best management practices (BMPs) that are approved to reduce the phosphorus load and runoff volume in accordance with the Virginia Runoff Reduction Method.</p> <p>While the stormwater regulations encourage and incentivize runoff reduction BMPs through the use of the runoff reduction method, traditional BMPs are still allowed and are assigned a pollutant remove efficiency. It is likely that a locality can only get LID credit if it adopts an ordinance that only allows the LID BMPs to be utilized for compliance with the regulations.</p> <p>Sources: Va. Code §62.1-44.15:28(8); 9 Va. Admin Code § 25-870-65; 9 Va. Admin Code § 25-870-65; Virginia Department of Environmental Quality, Virginia Stormwater BMP Clearinghouse, http://vwrrc.vt.edu/swc/.</p>	<p>UP TO 25 CREDITS</p> <p>VSMP AUTHORITIES HAVE THE AUTHORITY TO ESTABLISH LIMITATIONS ON THE USE OF SPECIFIC BMPs, SO THE CREDITS THAT ARE GENERATED WILL VARY AMONG LOCALITIES BASED ON WHICH BMPs THEY DECIDE TO INCORPORATE.</p>
Public Inspection and Maintenance Max credits: 20	<p>CRS Requirements: Inspection and maintenance of stormwater management facilities must be required.</p> <p>Source: CRS Coordinator's Manual 450-11.</p>	
	<p>VA Stormwater Act/VSMP: The stormwater regulations require the VSMP authority to require the provision of long-term responsibility for and maintenance of stormwater management facilities. The requirements must run with the land, provide for all necessary access for purposes of maintenance and regulatory inspections, provide for inspections and maintenance and submission of inspection and maintenance reports to the VSMP authority, and be enforceable by all appropriate governmental parties.</p> <p>Source: 9 Va. Admin Code § 25-870-112(A).</p>	20 CREDITS
Option 2: Watershed Master Planning (WMP)		Estimated Credits
Max Credits: 315	<p>CRS Requirements:</p> <ul style="list-style-type: none"> • Community must adopt a watershed master plan for one or more of the watersheds that drain into the community, and the plan must identify the natural drainage system and constructed channels. • The community must have adopted regulatory standards that are based on the plan and that receive credit under SMR in section 452.a. of the CRS manual. • The plan's regulatory standards must manage future peak flows so they do not increase over present values. • The plan's regulatory standards must require management of runoff from all storms up to and including the 25-year event. • For any plan that is more than 5 years old, the community must evaluate the plan to ensure that it remains applicable to current conditions. • WMP1 credit (see CRS coordinator's Manual) must be received in order to receive credit for any of the other items. <p>Source: CRS Coordinator's Manual 450-15.</p>	
	<p>Virginia Actions that May Generate Credit:</p> <ul style="list-style-type: none"> • WIPs • TMDL action Plans • Regional cooperation efforts like watershed studies and coordination 	VARIES

Option 3: Erosion and Sediment Control (ESC)		Estimated Credits
Max Credits: 40	<p>CRS Requirements: The community must apply erosion and sediment control regulations to all construction sites within the community. The number of credits generated varies depending on the size of the disturbed land that is regulated.</p> <ul style="list-style-type: none"> · 40 credits if regulations control soil loss from any disturbed land greater than 1,000 square feet · 30 credits if regulations control erosion and soil loss from disturbed land greater than 0.5 acres · 10 credits if regulations control erosion and soil loss from disturbed land greater than 1 acre. <p><i>Source:</i> CRS Coordinator's Manual 450-10 and 450-19.</p>	
	<p>Virginia Stormwater Management Act: Developers must provide SWPPs, which include an approved erosion and sediment control plan that is consistent with the Virginia Erosion and Sediment Control regulations. Prior to land disturbance, the VSMP authority must approve the plan, and it must be designed and implemented during construction activities.</p> <p><i>Source:</i> 9 Va. Admin Code § 25-870-54.</p> <p>Virginia Erosion and Sediment Control Law: Virginia Erosion and Sediment Control Law applies to land-disturbing activities of 10,000 square feet or more. Therefore, all localities should receive 30 credits if they comply with the Erosion and Sediment Control Law.</p> <p><i>Source:</i> CRS Uniform Minimum Credit Virginia.</p>	30 CREDITS
Option 4: Water Quality (WQ)		Estimated Credits
Max Credits: 20	<p>CRS Requirements: To receive credits, the community's stormwater management regulations must either specify one or more measures or refer to BMPs as published in an official government reference.</p> <p><i>Source:</i> CRS Coordinator's Manual 450-21.</p> <p>VA Stormwater Management Act: On July 1, 2014, the Virginia Stormwater Management Handbook will reflect changes to the Virginia Stormwater BMPs.</p> <ul style="list-style-type: none"> · Currently, approved stormwater BMPs are listed in the BMP Clearinghouse. The regulations provide a list of best management practices that are approved to reduce the phosphorus load and runoff volume in accordance with the Virginia Runoff Reduction Method. · The new regulations limit the phosphorus load to 0.41 pounds per acre per year in order to achieve no net increase in nutrients for new development and there are also limits on redevelopment. <p><i>Sources:</i> 9 Va. Admin Code § 25-870-65; 9 Va. Admin Code 25-870-63.</p>	Close to 20 credits
<p><i>The number of credits that compliance with the regulations may generate is an estimate, and the amount that localities actually receive will be determined by CRS officials.</i></p>		



References

- ¹ NATIONAL FLOOD INSURANCE PROGRAM *Community Rating System*, FED. EMERGENCY MGMT. AGENCY, <http://www.fema.gov/national-flood-insurance-program-community-rating-system> (last updated Aug. 8, 2014).
- ² CRS STATE PROFILE: VIRGINIA, FEDERAL EMERGENCY MANAGEMENT AGENCY 5 (Jan. 2014), http://crsresources.org/files/200/state-profiles/va-state_profile.pdf.
- ³ CRS STATE PROFILE: VIRGINIA, FEDERAL EMERGENCY MANAGEMENT AGENCY 1 (Jan. 2014), http://crsresources.org/files/200/state-profiles/va-state_profile.pdf.
- ⁴ *Id.*
- ⁵ *Id.*
- ⁶ A portion of the estimated credits were based on evaluated objective criteria; others are subjective and will be evaluated by CRS agents. Estimated credits do not include the mandatory impact adjustment, which is correlative to various factors.
- ⁷ CRS State Profile: Virginia (Jan. 2014), http://crsresources.org/files/200/state-profiles/va-state_profile.pdf.
- ⁸ CRS Uniform Minimum Credit Virginia (Aug. 2014), <http://crsresources.org/files/200/umc/virginia.pdf>.
- ⁹ *Id.*
- ¹⁰ FED. EMERGENCY MGMT. AGENCY, *supra* note 10 at 450-5.
- ¹¹ CRS STATE PROFILE: VIRGINIA, FEDERAL EMERGENCY MANAGEMENT AGENCY 4 (Jan. 2014), http://crsresources.org/files/200/state-profiles/va-state_profile.pdf.
- ¹² CRS Coordinator's Manual 450-5 and 450-6. Communities receive 110 credits if all development is regulated; 90 credits if all development regulated except parcels of acre or less or increases in impervious area of 5,000 sq. feet; 60 credits if development regulated except parcels of 1 acre or less; and 15 credits if development regulated except for parcels of 5 acres or more.
- ¹³ VA. CODE § 62.1-44.15:28(5); VA. CODE § 62.1-44.15:34(C)(4); VA Stormwater Management Model Ordinance Sec. 1-3(c)(3)-(4).
- ¹⁴ VA. CODE § 62.1-44.15:34(C)(4).
- ¹⁵ CRS Coordinator's Manual 450-7 and 450-8. DS = the total of the following for the storms used to measure the impact of the new development:
 - DS1= EITHER 14 credits, if detention is designed for a 10-year storm, OR 21 credits, if the volume is also controlled.
 - DS2= EITHER 36 credits, if detention is designed for a storm larger than the 10-year but smaller than the 100-year storm, OR 54 credits, if the volume is also controlled.
 - DS3= EITHER 100 credits, if detention is designed for the peak flow of the 100-year storm, OR 150 credits if the volume is also controlled.
- ¹⁶ VA. ADMIN CODE § 25-870-66(F); 9 VA. ADMIN CODE § 25-870-72(A).
- ¹⁷ CRS Coordinator's Manual 450-8.
- ¹⁸ VA. CODE § 62.1-44.15:28(8); 9 VA. ADMIN CODE § 25-870-65; 9 VA. ADMIN CODE § 25-870-65; Virginia Department of Environmental Quality, Virginia Stormwater BMP Clearinghouse, <http://vwrrc.vt.edu/swc/>.
- ¹⁹ CRS Coordinator's Manual 450-11.
- ²⁰ 9 VA. ADMIN CODE § 25-870-112(A).
- ²¹ CRS Coordinator's Manual 450-15. The community must have adopted regulatory standards that are based on the plan and that receive credit under SMR in section 452.a. of the CRS manual.
 - The plan's regulatory standards must manage future peak flows so they do not increase over present values.
 - The plan's regulatory standards must require management of runoff from all storms up to and including the 25-year event
 - For any plan that is more than 5 years old, the community must evaluate the plan to ensure that it remains applicable to current conditions.

- WMP1 credit (See CRS Coordinator's Manual) must be received in order to receive credit for any of the other items.
- 22 CRS Coordinator's Manual 450-10 and 450-19.
- 23 CRS Uniform Minimum Credit Virginia.
- 24 *CRS Coordinator's Manual 450-21.*
- 25 9 VA. ADMIN CODE § 25-870-65; 9 VA. ADMIN CODE § 25-870-63.
- 26 Other stormwater management actions may generate credit. See Activities 330, 410, 420, 430 and 440.
- 27 FED. EMERGENCY MGMT. AGENCY, OMB No. 1660-0022, NATIONAL FLOOD INSURANCE PROGRAM COMMUNITY RATING SYSTEM COORDINATORS MANUAL (2013) at 530-2.
- 28 *Id.* at 540-13.
- 29 VA. CODE ANN. § 62.1-44.15:68
- 30 Reg. 9 VAC 25-830-140(1).
- 31 Reg. 9 VAC 25-830-140(3).
- 32 VA. CODE ANN. § 28.2-1300. VA. CODE ANN. § 28.2-1308(A)(1) states that, in considering whether a permit is granted, "[w]etlands of primary ecological significance shall not be altered so that the ecological systems in the wetlands are unreasonably disturbed...."
- 33 VA. CODE ANN. § 28.2-1400
- 34 VA. CODE ANN. § 10.1-1700
- 35 VA. CODE ANN. § 10.1-1009
- 36 VA. CODE ANN. § 10.1-1700
- 37 VA. CODE ANN. § 62.1-44.15:68
- 38 Reg. 9 VAC 25-830-140(4)-(5).
- 39 VA. CODE ANN. § 28.2-1300.
- 40 VA. CODE ANN. § 62.1-44.15:68
- 41 Reg. 9 VAC 25-830-80(A)-(B).
- 42 VA. CODE ANN. § 28.2-1300.
- 43 VA. CODE ANN. § 62.1-44.15:68
- 44 Reg. 9 VAC 25-830-100.
- 45 UNITED STATES FLOOD LOSS REPORT, NOAA 8 (2012), <http://www.nws.noaa.gov/hic/summaries/WY2012.pdf>
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- 47 *City-Wide Coastal Flooding Study: City of Norfolk*, FURGO ATLANTIC (Feb. 29, 2012), <http://www.norfolk.gov/DocumentCenter/View/1752>.
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- 49 Sarah Kleiner Varble, *Cost of Flood Insurance Poised to Rise for Thousands*, VIRGINIAN-PILOT (September 24, 2013), <http://hamptonroads.com/2013/09/cost-flood-insurance-poised-rise-thousands>.
- 50 *Id.*
- 51 Michael Felberbaum & Brock Vergakis, *Flood Insurance Rates are on the Rise in Virginia*, PILOT ONLINE.COM (March 24, 2014), <http://hamptonroads.com/2014/03/flood-insurance-rates-are-rise-virginia>.
- 52 CRS STATE PROFILE: VIRGINIA, FEDERAL EMERGENCY MANAGEMENT AGENCY 1 (Jan. 2014), http://crsresources.org/files/200/state-profiles/va-state_profile.pdf.
- 53 *Id.*
- 54 *Id.*
- 55 RS State Profile: Virginia (Jan. 2014), http://crsresources.org/files/200/state-profiles/va-state_profile.pdf.
- 56 A portion of the estimated credits were based on evaluated objective criteria; others are

subjective and will be evaluated by CRS agents.

⁵⁷ *Frequently Asked Questions about the Bay TMDL*, U.S. ENVTL. PROT. AGENCY, <http://www.epa.gov/reg3wapd/tmdl/ChesapeakeBay/FrequentlyAskedQuestions.html> (last visited Aug. 31, 2014).

⁵⁸ VA. CODE ANN. § 62.1-44.15:25 (2014).

⁵⁹ Lynne C. Rhode, John W. Daniel II & Channing J. Martin *Virginia Stormwater Program Moved to the DEQ*, WILLIAMS MULLEN (Jul. 7, 2013), <http://www.williamsmullen.com/news/virginia-stormwater-program-moved-deq>.

⁶⁰ *Id.*

⁶¹ See *July 1, 2014: Stormwater Regulations*, available at <http://www.loudoun.gov/DocumentCenter/View/96065>.

⁶² Larry Land, *2014 Stormwater Legislation*, VIRGINIA ASSOCIATION OF COUNTIES (Mar. 31, 2014), <http://www.vaco.org/2014-stormwater-legislation/>.

⁶³ *Id.*

⁶⁴ 9 VA. ADMIN CODE § 25-870-150.

⁶⁵ See Lynne C. Rhode, *supra* note 20.

⁶⁶ See 2014 Fiscal Impact Statement, VA. DEPT. OF PLANNING & BUDGET (Mar. 2, 2014), <http://leg1.state.va.us/cgi-bin/legp504.exe?141+oth+HB1173FS1122+PDF>.

⁶⁷ VA. DEPT. OF ENVTL. QUALITY, VIRGINIA STORMWATER MANAGEMENT (VSMP) LOCAL ORDINANCE CHECKLIST (Dec. 20, 2013), available at <http://www.deq.virginia.gov/Portals/0/DEQ/Water/Publications/VSMPOrdinanceChecklist.docx>.

⁶⁸ See VA. DEPT. OF ENVTL. QUALITY, VIRGINIA STORMWATER MANAGEMENT MODEL ORDINANCE CHECKLIST (Dec. 12, 2013), available at http://www.townhall.virginia.gov/L/GetFile.cfm?File=C:\TownHall\docroot\GuidanceDocs\440\GDoc_DEQ_5422_v1.pdf.

⁶⁹ VA. CODE ANN. § 62.1-44.15:33A (2014).

⁷⁰ *Id.*

⁷¹ *Id.*

⁷² *Id.*

⁷³ See *July 1, 2014: Stormwater Regulations*, *supra* note 22.

⁷⁴ *Id.*

⁷⁵ *Id.*

⁷⁶ *Id.*

⁷⁷ *Id.*

⁷⁸ FED. EMERGENCY MGMT. AGENCY, *supra* note 10.

⁷⁹ *Id.*

⁸⁰ CRS State Profile: Virginia, *supra* note 5.

⁸¹ The specific potential for CRS credits from each approach is detailed in Appendix A.

⁸² FED. EMERGENCY MGMT. AGENCY, *supra* note 10.

⁸³ VA. CODE ANN. § 62.1-44.15:28(7) (2014).

⁸⁴ FED. EMERGENCY MGMT. AGENCY, *supra* note 10.

⁸⁵ *Id.*

⁸⁶ *Id.*

⁸⁷ VA. CODE ANN. § 62.1-44.15:28(5) (2014); VA. CODE ANN. § 62.1-44.15:34(C)(4) (2014); Va. Stormwater Management Model Ordinance § 1-3(c)(3)-(4).

⁸⁸ VA. CODE ANN. § 62.1-44.15:24 (2014).

⁸⁹ FED. EMERGENCY MGMT. AGENCY, *supra* note 10 at 450-6.

⁹⁰ *Chesapeake Bay Preservation Act*, VA. DEP. OF ENVTL. QUALITY, <http://www.deq.virginia.gov/Programs/Water/ChesapeakeBay/ChesapeakeBayPreservationAct.aspx> (last visited Aug. 31, 2014).

⁹¹ Scott Van Der Hyde & Mark Badanowski, *When the Chesapeake Bay Preservation Act Fails: A Suffolk Case Study*, VA. COASTAL POLICY CLINIC (2013), <http://law.wm.edu/academics/programs/jd/electives/clinics/vacoastal/documents/march2014reports/preservationact.pdf>.

⁹² *Id.*

- ⁹³ *Chesapeake Bay Preservation Act*, VA. CODE ANN. § 62.1-44.15:67 et seq. (2014); Va. Stormwater Management Model Ordinance § 1-3(c)(3)-(4); VA. CODE ANN. §62.1-44.15:34(C)(4) (2014).
- ⁹⁴ FED. EMERGENCY MGMT. AGENCY, *supra* note 10 at 450-5.
- ⁹⁵ Scott Van Der Hyde, *supra* note 64.
- ⁹⁶ FED. EMERGENCY MGMT. AGENCY, *supra* note 10 at 450-5.
- ⁹⁷ *Id.* at 450-5.
- ⁹⁸ *Id.* at 450-6.
- ⁹⁹ CRS Coordinator's Manual 450-7 and 450-8.
- ¹⁰⁰ CRS Coordinator's Manual 450-7 and 450-8.
- ¹⁰¹ VA. CODE ANN. §62.1-44.15:28(A) (2014).
- ¹⁰² 9 VA. ADMIN CODE § 25-870-62.
- ¹⁰³ 9 VA. ADMIN CODE § 25-870-116(A).
- ¹⁰⁴ 9 VA. ADMIN CODE § 25-870-116(A)(1), (2).
- ¹⁰⁵ 9 VA. ADMIN CODE § 25-870-116(C).
- ¹⁰⁶ 9 VA. ADMIN CODE § 25-870-116(D).
- ¹⁰⁷ 9 VA. ADMIN CODE § 25-870-66(F).
- ¹⁰⁸ 9 VA. ADMIN CODE § 25-870-72(A).
- ¹⁰⁹ 9 VA. ADMIN CODE § 25-870-66; 9 VA. ADMIN CODE § 25-870-72.
- ¹¹⁰ 9 VA. ADMIN CODE § 25-870-65.
- ¹¹¹ FED. EMERGENCY MGMT. AGENCY, *supra* note 10 at 450-8.
- ¹¹² *Id.*
- ¹¹³ CRS Coordinator's Manual 450-8.
- ¹¹⁴ CRS Coordinator's Manual 450-8 and 450-9.
- ¹¹⁵ VA. CODE ANN. §62.1-44.15:28(8) (2014).
- ¹¹⁶ 9 VA. ADMIN CODE § 25-870-65.
- ¹¹⁷ *Low Impact Development*, E. PANHANDLE REG'L PLANNING & DEV. COUNCIL - REGION 9, <http://www.region9wv.com/bay/LIDtools.html> (last visited Aug. 31, 2014).
- ¹¹⁸ 9 VA. ADMIN CODE § 25-870-65
- ¹¹⁹ 9 VA. ADMIN CODE § 25-870-65; Virginia Stormwater BMP Clearinghouse, VA. DEP. OF ENVTL. QUALITY, <http://vwrrc.vt.edu/swc/> (last updated Apr. 23, 2014).
- ¹²⁰ 9 VA. ADMIN CODE § 25-870-65(D).
- ¹²¹ FED. EMERGENCY MGMT. AGENCY, *supra* note 10 at 450-10.
- ¹²² *Id.*
- ¹²³ *Id.*
- ¹²⁴ *Id.*
- ¹²⁵ *Id.*
- ¹²⁶ CRS Coordinator's Manual 450-11.
- ¹²⁷ CRS Coordinator's Manual 450-10 and 450-11.
- ¹²⁸ 9 VA. ADMIN CODE § 25-870-112(A).
- ¹²⁹ 9 VA. ADMIN CODE § 25-870-114(B).
- ¹³⁰ 9 VA. ADMIN CODE § 25-870-144(C).
- ¹³¹ 9 VA. ADMIN CODE § 25-870-116(C).
- ¹³² *Stormwater Local Assistance Fund Program Guidelines*, VA. DEP. OF ENVTL. QUALITY (Aug. 15, 2014), http://www.deq.virginia.gov/Portals/0/DEQ/Water/ConstructionAssistanceProgram/SLAF_Guidelines_8-2014.pdf.
- ¹³³ *Virginia Clean Water Revolving Loan Fund Storm Water Guidelines*, VA. DEP. OF ENVTL. QUALITY <http://www.deq.virginia.gov/Programs/Water/CleanWaterFinancingAssistance/StormwaterFundingPrograms/StormwaterLoans.aspx> (last visited Aug. 31, 2014).
- ¹³⁴ *Virginia Pooled Financing Programing*, VA. RES. AUTH., <http://www.virginiaresources.org/pooledfinancing.shtml> (last visited Aug. 31, 2014).
- ¹³⁵ VA. CODE ANN. § 62.1-241.12 (2014).
- ¹³⁶ FED. EMERGENCY MGMT. AGENCY, *supra* note 10 at 450-14.

137 *Id.*

138 *Id.*

139 Virginia's Watershed Implementation Plans for the Chesapeake Bay, VA. DEP. OF ENVTL. QUALITY, <http://www.deq.virginia.gov/Programs/Water/ChesapeakeBay/ChesapeakeBay-WatershedImplementationPlan.aspx>

140 Virginia's Stormwater Program Shifts to the Department of Environmental Quality, HAMPTON ROADS PLANNING DIST. COMM'N (Aug. 21, 2013), <http://www.hrpdcva.gov/news/index/print/id/1566/>; 9 VA. ADMIN CODE § 25-890-40 § 1(B)-(C).

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142 9 VA. ADMIN CODE § 25-890-40 § 1(B)(1).

143 FED. EMERGENCY MGMT. AGENCY, *supra* note 10 at 450-18.

144 *Id.* at 450-19.

145 CRS Coordinator's Manual 450-19.

146 CRS Coordinator's Manual 450-10 and 450-19.

147 9 VA. ADMIN CODE § 25-870-54.

148 CRS Uniform Minimum Credit Virginia, *supra* note 7.

149 FED. EMERGENCY MGMT. AGENCY, *supra* note 10 at 450-20.

150 *Id.*

151 CRS Coordinator's Manual 450-21.

152 CRS Coordinator's Manual 450-21.

153 9 VA. ADMIN CODE § 25-870-65.

154 *Id.*

155 *Id.*

156 *Id.*

157 9 VA. ADMIN CODE § 25-870-63.

158 CRS Uniform Minimum Credit Virginia, *supra* note 7.

159 *Id.*

160 A portion of the estimated credits were based on evaluated objective criteria; others are subjective and will be evaluated by CRS agents.

161 NATIONAL FLOOD INSURANCE PROGRAM COORDINATOR'S MANUAL: OMB NO. 1660-0022, FEMA 110-6 (2013), available at http://crsresources.org/files/2013-manual/crs_manual_508_ok_5_10_13_bookmarked.pdf [hereinafter COORDINATOR'S MANUAL].

162 CRS STATE PROFILE: VIRGINIA, FEDERAL EMERGENCY MANAGEMENT AGENCY 4 (Jan. 2014), http://crsresources.org/files/200/state-profiles/va-state_profile.pdf.

163 For a more detailed explanation, *See Id.* at 420-3 to -6.

164 For a more detailed explanation, *See Id.* at 420-11 to -12.

165 For a more detailed explanation, *See Id.* at 420-13 to -16.

166 For a more detailed explanation, *See Id.* at 420-28 to -29.

167 For a more detailed explanation, *See Id.* at 420-20 to -22.

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169 Reg. 9 VAC 25-830-140(3).

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