Healthy Waters and VNEMO Program in the Coastal Zone
FY11 Task 10
Final Report, Grant Period October 1, 2011 to September 30, 2012
Grant# NA11NOS4190122
Compiled by Todd Janeski, VCU, Department of Life Sciences
Virginia Department of Conservation and Recreation,
Division of Stormwater Management

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Executive Summary

The VCU Environmental Scientist/Analyst, as retained by the Virginia Department of Conservation and Recreation (DCR), continued to serve as the Coastal Nonpoint Source Pollution Control Program (CNPS) Manager to administer and implement the NOAA Section 6217 Virginia Coastal Nonpoint Source Pollution Program at the Virginia Department of Conservation and Recreation. The focus of the implementation of the Coastal NPS Program includes the oversight of programs, projects, grants and grant budgets, providing technical support to VDCR Division of Stormwater Management and the Virginia Coastal Zone Management Program, as it relates to coastal zone ecology, management, and restoration. The VCU Environmental Scientist/Analyst serves other roles and provides additional support to the Virginia DCR in nonpoint source pollution issues, land conservation and resource protection, Chesapeake Bay TMDL, grant administration, program and project development and implementation, and policy analysis and development.

Overview

The Environmental Analyst, at the Virginia Commonwealth University, continued to serve as the Program Manager of the Virginia Coastal Nonpoint Source Pollution Control Program (CNP) at the Virginia Department of Conservation and Recreation. Due to the extremely limited funding to support the 56 Management Measures as outlined in the 6217 Guidance, the focus of the Coastal NPS Program is the management and implementation of the Virginia Healthy Waters Initiative (HWI) and the administration and implementation of the Virginia Network for Education of Municipal Officials Program (VNEMO). The VCU Environmental Analyst/ Program Manager directs both the HWI and the VNEMO Program, focusing support to the regional planning district commissions and through regional educational and training events. The Program Manager supported the Sustainable Shoreline and Green Infrastructure Projects in the areas of blue/green infrastructure planning, climate change adaptation planning, coastal community development and nature-resource based planning to achieve local policy changes that protect coastal resources. The Program Manager also directed the construction and research development of innovative stormwater management technologies at the Science Museum of Virginia.

The Program Manager implemented these programs to support various coastal priorities such as the Sustainable Community Planning Focal Area Projects, the Chesapeake Bay Goal Implementation Team 4 (Healthy Watersheds), and the implementation of the National Fish and Wildlife Foundation Grant at the Science Museum of Virginia.

The VCU Environmental Analyst concluded a strong role with the implementation of the VNEMO project in coordinating specific roles and responsibilities within the program delivery

and context of the Shoreline Project, under the guidance of the Northern Virginia Regional Commission (NVRC), the VNEMO client. The VNEMO Program Manager outlined the process of conducting public listening sessions around Climate Change and Sea Level Rise in Northern Virginia. Recognizing the need for additional resources to meet the needs under this project, a contract was established with the University of VA Institute for Environmental Negotiation (UVA IEN) to lead the listening sessions in the same manner as those conducted in the VA Beach area. The contract for IEN was secured through the NVRC. The county of Prince William agreed to host the listening sessions, which were planned for the fall, 2011. However, due to an unfortunate decision by Prince William County's Board of Supervisors, the concept was not supported. The project team determined an alternative approach would be to conduct a "Looking Back to Move Forward" workshop sharing with the entire working group and their localities the work and efforts of the previous two years to advance sea level rise communication. This workshop was held in the Spring, 2012 at the Fairfax County Government Complex and was attended by approximately 25 participants representing the partners of the NVRC Shoreline Working group. The workshop concluded with consensus to revisit the effort and data while continuing to obtain support from their respective local officials.

The Coastal NPS Program Manager was requested by VDCR to implement a training program to improve the capacity of the field staff in implementing outcome based technical assistance for local governments, following the model of the VNEMO Program. This initiative was intended to continue to prepare the VDCR staff for increases in requests for technical assistance from local government for implementation of the CBTMDL, development of the CBTMDL Watershed Implementation Plans and roll-out of the VA SWM Regulations.

The Coastal NPS Program Manager continued the management of the +$2M, NFWF funded, project at the Virginia Science Museum. The Manager shares the Project Management role with the Director of Science at the Museum to facilitate full coverage of all aspects of project implementation. As the project leadership, the Program Manager outlined the overall project and identified teams to prepare the engineering designs, monitoring program design, educational and outreach materials and the advertisement and hiring of a contractor to conduct the installation of the practices at the museum. During this grant period, the construction of porous concrete, bioretention facility, tree well filters, rainwater harvesting system and green roof commenced.

In addition, the installation of the automated stormwater samplers was initiated as was the collection of samples. The initial data collected indicated a lack of effluent from the treatment devices. This lack of effluent, while limiting the ability to effectively evaluate the performance of the treatment structures, indicates a significant reduction of volume of stormwater being added to the combined sewer overflow system and being infiltrated into the substrate. Several workshops and trainings were conducted at the Science Museum including for engineers, local officials, the construction

The Program Manager, under the VNEMO banner, continued to work with the VDCR Division of Natural Heritage in the development VA Ecological Value Assessment (VEVA). This database effectively integrates the INSTAR stream database at VCU. The Manager delivered a training at the Chesapeake Bay National Estuarine Research Reserve of Virginia (CBNRRVA) on the overall VEVA project, with specific focus on the INSTAR/ Healthy Waters components.

Trainings, Technical Assistance Delivery and Capacity Building

During the reporting period, several special events, workshop and trainings were conducted. In April, 2012, the Program Manager delivered a presentation to the DEQ Water Division on the background, application and implementation of the Healthy Waters Program. The presentation was part of the annual DEQ Waters Division meeting and was intended to solicit input from field and Richmond staff on the means to fully expand and implement the Program. Approximately 60 participants were in attendance. The event resulted in several meetings with the Probabilistic Monitoring (Prob-Mon) staff to discuss the integration of INSTAR data with the Pro-Mon assessment process. The DEQ staff coordinated with the EPA Monitoring programs in Corvallis, OR and confirmed the HWI data and assessment process (INSTAR) was more than adequate to supplement missing DEQ Prob-Mon data.

The Program Manager partnered with the CBNRRVA, DCR Division of Natural Heritage, VIMS, VDGIF and local partners to deliver a training in the VEVA dataset and application of these data. This day-long workshop was held at the CBNRRVA facility in Gloucester, VA and attended by over 50 participants representing local and regional government, NGOs and other potential users of the VEVA database. Specifically, the Program Manager provided the background and application of the Healthy Waters Program and integrated role within VEVA.

The Program Manager delivered and coordinated several programs, workshops and trainings at the Science Museum of Virginia during the reporting cycle. The Program Manager coordinated with the DCR Division of Stormwater Management to host the Commonwealth of Virginia's Erosion and Sediment Control and Stormwater Management Certification Regulation trainings at the museum and use the stormwater research site as a field site for additional trainings. In coordination with the Museum and the VDCR, the museum hosted over 12 workshops during the reporting period, training over 600 participants.

The Program Manager, under the NEMO umbrella, delivered three Rain Barrel Workshops at the Science Museum October, 2011. Each workshop was prefaced with a 45 minute power point presentation on stormwater, the importance of rain barrels and other stormwater mitigation practices and the research facility constructed at the Museum. Nearly 100 rainbarrels were constructed during this one-day event.

The Program Manager provided presentations, lead tours and conducted field workshops illustrating the LID installed practices to the City of Richmond's Virginia Water Environmental Association meeting (52 participants); one pervious concrete certification workshop (10 participants) in September, 2012 led by Virginia ReadyMix Concrete Association; a Roanoke Cement Corporation-Powhatan ReadyMix Co. regional sales meeting (12 participants) in September, 2012; and Centennial Construction Company's regional meeting on LID technologies in Oct. 2012 (48 participants).

The Program Manager was requested in mid 2011 to help improve and expand the capacity and internal capabilities of State personnel to meet the demands locally and future potential due to Virginia Stormwater Management Program implementation and the Chesapeake Bay TMDL Watershed Implementation Plan, Phase 2. The VNEMO Program Manager partnered with the

NVRC and the UVA IEN to develop a training specifically to equip state personnel and local and regional staff to best engage public policy participants that choose to be obstructive as opposed to inclusive in the decision making process. This training was conducted in the 29 October, 2011 and held at the Virginia Science Museum. This training included more than 45 participants representing the VDCR field staff from the Divisions of Stormwater Management and Natural Heritage; VDEQ; VIMS Coastal Resources Center, the Coastal Planning District Commissions and local government.

Project Management and Implementation

During the grant cycle, the Program Manager continued to co-manage the National Fish and Wildlife Foundation funded project to develop a low impact development research, testing, certification and training facility at the Virginia Science Museum. During this phase of the project, the Program Manager took the role of Research Director to guide the collection, analysis and expansion of data relevant to the treatment of urban stormwater. This project purpose is to demonstrate, teach and monitor such practices as bioretention, porous pavement, tree well filters, rainwater harvesting and green roof technologies in a controlled environment.

The project has included an analysis of the CSO system and development of a CSO management plan that focuses on source control utilizing LID as a means of managing CSO events. A cost-benefit analysis communicating the economic benefits of using LID to solve the challenges of CSO issues was conducted, concluding LID has significant positive impacts. The benefits of LID are multifold; the project demonstrates the environmental benefits of LID, the economic benefits of source control and the ability to address the hydrologic changes due to changes in climate.

Under these, the environmental benefits are demonstrated in the onsite treatment and removal of pollutants (N, P, Sediment) through event based stormwater monitoring. For each event, 24 aliquots are composited and analyzed by the City of Richmond Wastewater Treatment Laboratory. For the bioretention and tree well filters, ISCO 6712 Refrigerated (FR) Automated samplers are employed to extract event based, time-spaced 250ml aliquots of influent and/or effluent from the respective treatment structures. The porous pavement effluent is monitored with an ISCO 6712 FR unit to determine the discharge rate and duration and pollutant removal. The influent analysis for the porous utilizes the data from the bioretention influent due to the general site proximity and characteristics. For the tree well filters, both influent and effluent are monitored with an ISCO 6712FR unit. A rainwater harvesting system was installed during the project cycle to demonstrate the ability to capture the water necessary for irrigating the Museum's nearly one acre community farm. A 2500gallon storage tank was installed capturing water off of one train canopy and plumbed to a second 2500 storage tank was installed at the farm as the actual onsite reserve. A solar powered pump is utilized to distribute the stored rainwater to the irrigated farm site. Additional environmental benefits will be realized upon completion of the green roof. At nearly 4000sq ft, a green roof will be installed on the IMAX theater roof demonstrating the environmental and economic benefits of this technology. The completion of this phase is planned for 2013.

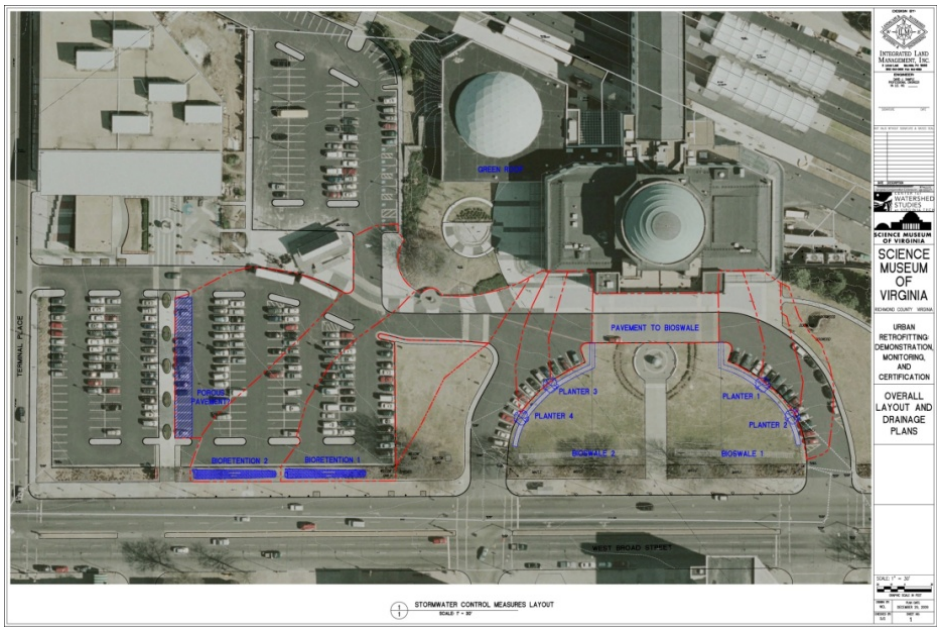
The economic benefits are determined through both a modeled approach based on actual site conditions and practices employed as well as through a literature review. Recent research has confirmed that LID can provide for significant cost savings when compared to traditional

methods for addressing Combined Sewer Overflows (CSO) and the separation of CSO systems (Gunderson, et al, 2011).

The climate change benefits are demonstrated through a modeled approach using the actual site conditions and practices employed. By modifying the site hydrology and weather conditions using various alternate climate change scenarios, the model has demonstrated significant ability to reduce the discharge of stormwater and continue to treat for stormwater runoff during these future conditions. This benefit can be realized at the current design levels, not simply by up-scaling the control or sizing of the structures. Therefore, current LID practices will have benefits for future changes in hydrology, protection of infrastructure and public health.

The VCU Environmental Specialist/Analyst and Program Manager continues to partner with the Science Museum of Virginia, Virginia Tech, University of New Hampshire, VA Dept of Conservation, Alliance for the Chesapeake Bay, NOAA Coastal Services Center and Chesapeake Bay Program Office, and the City of Richmond. This diverse partnership has permitted the project to reach to industry, association, private businesses and the public sector by demonstrating on-the-ground retrofits of LID.

Science Museum of Virginia



Site plan for proposed LID Practices

Constructed bioretention facility prior to planting

Completed, final bioretention facility with ISCO 6712FR Automated Sampler

Completed, final bioretention facility, shown with proximity to Broad Street

Bioretention facility during rain event

Bioretention influent monitoring, inlet of H-flume

Bioretention influent monitoring, outlet of H-flume

Porous concrete final installation, ISCO 6712FR automated effluent sampler visible

Porous concrete during rain event; infiltration visible

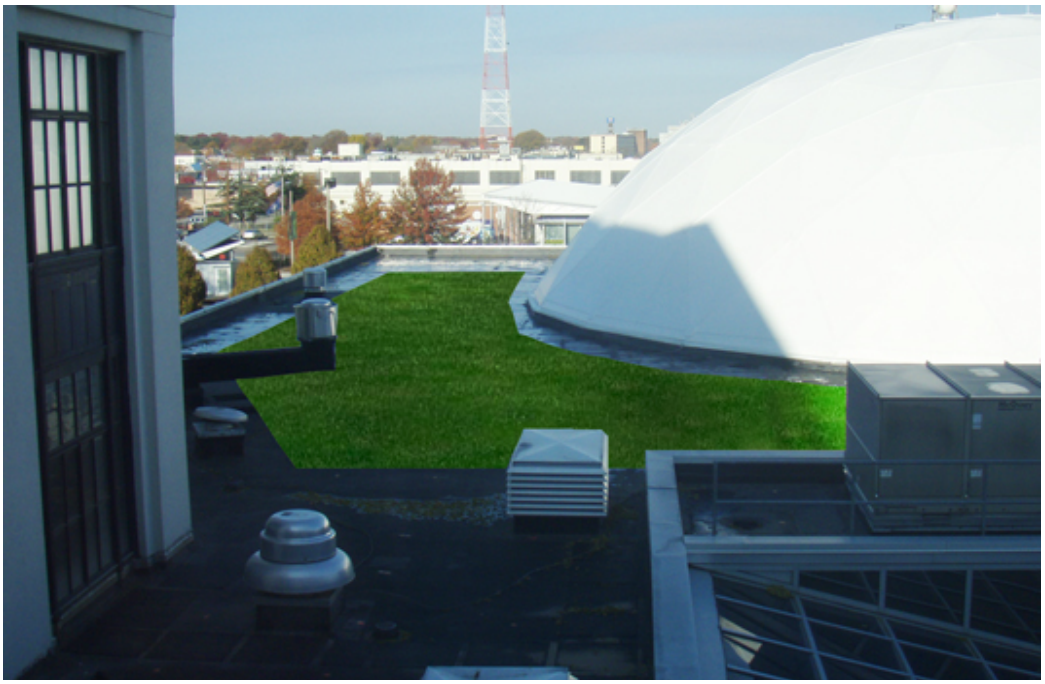
Constructed, final tree well filters

Constructed, final tree well filters with ISCO 6712 FR Automated Sampling Units, influent and effluent monitoring


Rainwater harvesting, 2500gal tank

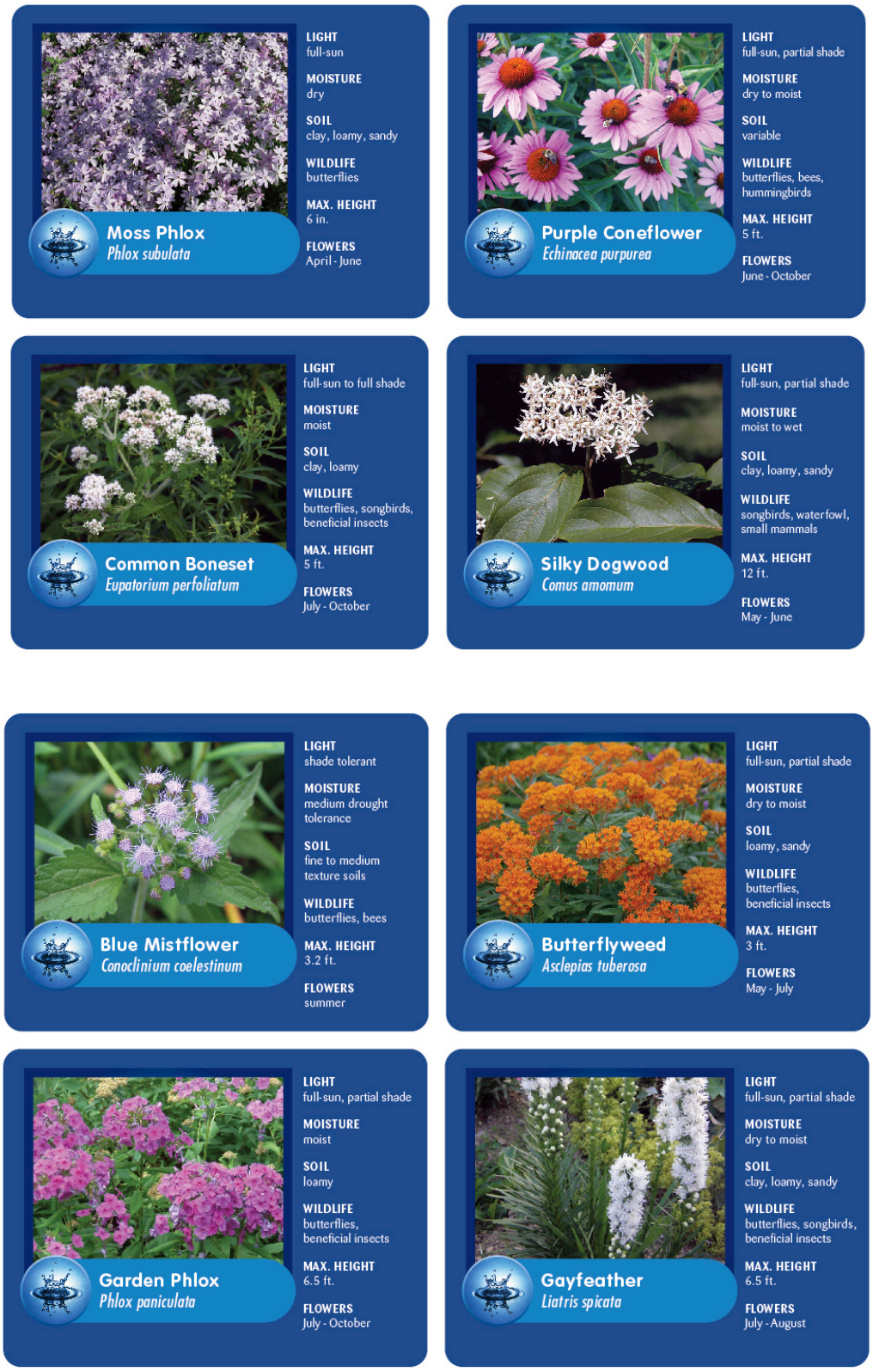
Rainwater harvesting storage at SMV Farm; 2500 gal tank with Solar pump and distribution system

Proposed green roof location adjacent to IMAX dome.

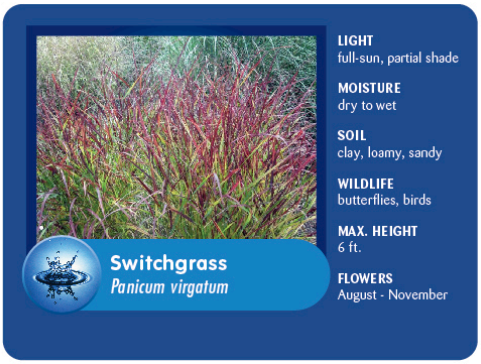


Artistic rendering of green roof installation.

“Rainkeepers” Gallery exhibit


Moss Phlox
Phlox subulata
LIGHT
full-sun
MOISTURE
dry
SOIL
clay, loamy, sandy
WILDLIFE
butterflies
MAX. HEIGHT
6 in.
FLOWERS
April - June
Purple Coneflower
Echinacea purpurea
LIGHT
full-sun, partial shade
MOISTURE
dry to moist
SOIL
variable
WILDLIFE
butterflies, bees, hummingbirds
MAX. HEIGHT
5 ft.
FLOWERS
June - October
Common Boneset
Eupatorium perfoliatum
LIGHT
full-sun to full shade
MOISTURE
moist
SOIL
clay, loamy
WILDLIFE
butterflies, songbirds, beneficial insects
MAX. HEIGHT
5 ft.
FLOWERS
July - October
Silky Dogwood
Cornus amomum
LIGHT
full-sun, partial shade
MOISTURE
moist to wet
SOIL
clay, loamy, sandy
WILDLIFE
songbirds, waterfowl, small mammals
MAX. HEIGHT
12 ft.
FLOWERS
May - June
Blue Mistflower
Conoclinium coelestinum
LIGHT
shade tolerant
MOISTURE
medium drought tolerance
SOIL
fine to medium texture soils
WILDLIFE
butterflies, bees
MAX. HEIGHT
3.2 ft.
FLOWERS
summer
Butterflyweed
Asclepias tuberosa
LIGHT
full-sun, partial shade
MOISTURE
dry to moist
SOIL
loamy, sandy
WILDLIFE
butterflies, beneficial insects
MAX. HEIGHT
3 ft.
FLOWERS
May - July
Garden Phlox
Phlox paniculata
LIGHT
full-sun, partial shade
MOISTURE
moist
SOIL
loamy
WILDLIFE
butterflies, beneficial insects
MAX. HEIGHT
6.5 ft.
FLOWERS
July - October
Gayfeather
Liatris spicata
LIGHT
full-sun, partial shade
MOISTURE
dry to moist
SOIL
clay, loamy, sandy
WILDLIFE
butterflies, songbirds, beneficial insects
MAX. HEIGHT
6.5 ft.
FLOWERS
July - August

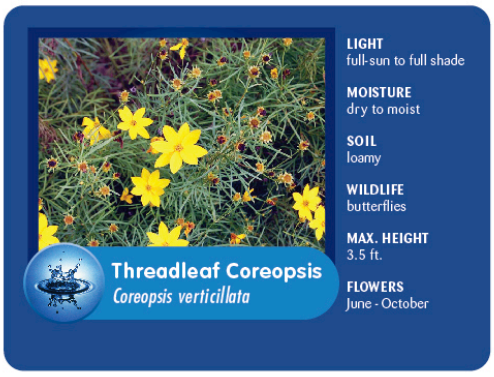

Muhly Grass
Muhlenbergia capillaris
LIGHT
full-sun
MOISTURE
dry soil intolerant
SOIL
clay to sandy
WILDLIFE
deer resistant
MAX. HEIGHT
3 ft.
FLOWERS
fall

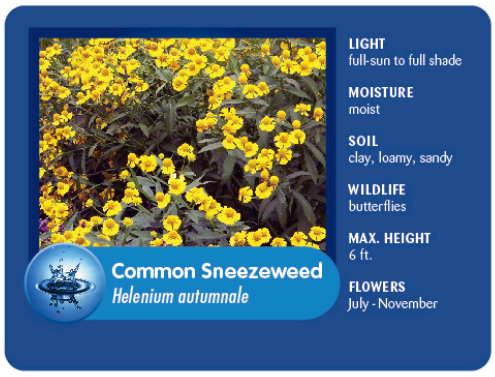

Switchgrass
Panicum virgatum
LIGHT
full-sun, partial shade
MOISTURE
dry to wet
SOIL
clay, loamy, sandy
WILDLIFE
butterflies, birds
MAX. HEIGHT
6 ft.
FLOWERS
August - November


Golden Fleece
Solidago sphacelata
LIGHT
full-sun, partial shade
MOISTURE
dry to medium
SOIL
clay to sandy
WILDLIFE
butterflies
MAX. HEIGHT
3 ft.
FLOWERS
summer to early fall

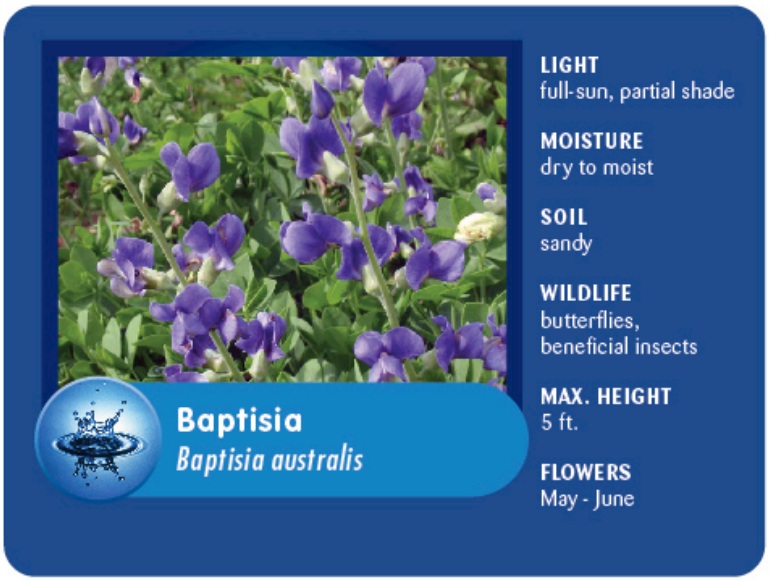

River Oats
Chasmanthius latifolium
LIGHT
full-sun, partial shade
MOISTURE
dry to moist
SOIL
clay, loamy, sandy
WILDLIFE
birds, small mammals
MAX. HEIGHT
5 ft.
FLOWERS
June - September


Little Bluestem
Schizachyrium scoparium
LIGHT
full-sun
MOISTURE
dry
SOIL
loamy, sandy
WILDLIFE
butterflies, birds
MAX. HEIGHT
4 ft.
FLOWERS
August - October

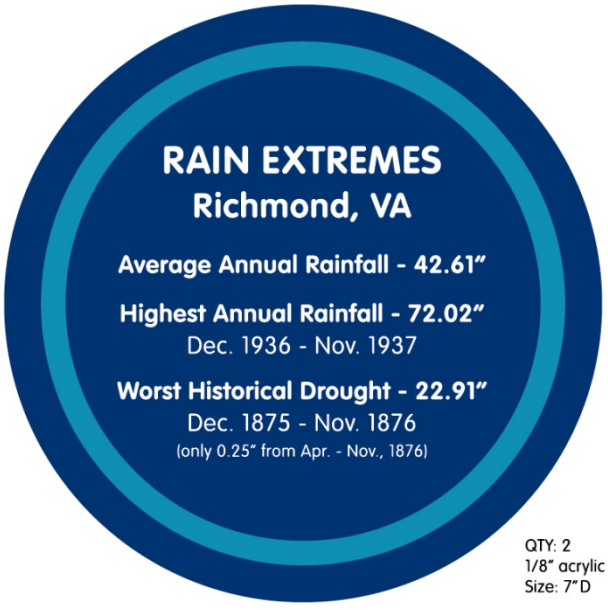

Threadleaf Coreopsis
Coreopsis verticillata
LIGHT
full-sun to full shade
MOISTURE
dry to moist
SOIL
loamy
WILDLIFE
butterflies
MAX. HEIGHT
3.5 ft.
FLOWERS
June - October


Common Sneezeweed
Helenium autumnale
LIGHT
full-sun to full shade
MOISTURE
moist
SOIL
clay, loamy, sandy
WILDLIFE
butterflies
MAX. HEIGHT
6 ft.
FLOWERS
July - November


New York Aster
Symphyotrichum novi-belgii
LIGHT
full-sun, partial shade
MOISTURE
moist to wet
SOIL
loamy
WILDLIFE
butterflies, beneficial insects
MAX. HEIGHT
4.5 ft.
FLOWERS
July - October
Virginia Spiderwort
Tradescantia virginiana
LIGHT
full-sun to full shade
MOISTURE
moist
SOIL
clay, loamy
WILDLIFE
butterflies, bees
MAX. HEIGHT
3 ft.
FLOWERS
April - July
Black-eyed Susan
Rudbeckia hirta
LIGHT
full-sun, partial shade
MOISTURE
dry to moist
SOIL
clay, loamy
WILDLIFE
butterflies, songbirds, beneficial insects
MAX. HEIGHT
3.5 ft.
FLOWERS
June - October
Dwarf Winterberry
Ilex verticillata
LIGHT
full-sun, partial shade
MOISTURE
dry to moist
SOIL
prefers slight acidity
WILDLIFE
butterflies, birds, honeybees
MAX. HEIGHT
5 ft.
FLOWERS
June - July

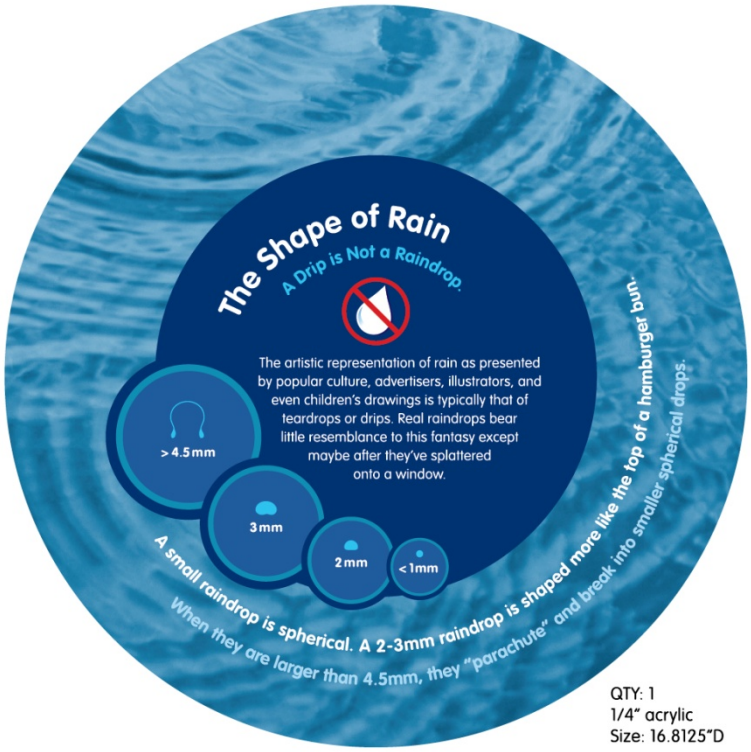

Baptisia
Baptisia australis
LIGHT
full-sun, partial shade
MOISTURE
dry to moist
SOIL
sandy
WILDLIFE
butterflies,
beneficial insects
MAX. HEIGHT
5 ft.
FLOWERS
May - June


Big Bluestem
Andropogon gerardii
LIGHT
full-sun, partial shade
MOISTURE
dry, moist, wet
SOIL
clay, loamy, sandy
WILDLIFE
butterflies, songbirds,
beneficial insects,
MAX. HEIGHT
6.5 ft.
FLOWERS
June - September


RAIN EXTREMES
Richmond, VA
Average Annual Rainfall - 42.61"
Highest Annual Rainfall - 72.02"
Dec. 1936 - Nov. 1937
Worst Historical Drought - 22.91"
Dec. 1875 - Nov. 1876
(only 0.25" from Apr. - Nov., 1876)
QTY: 2
1/8" acrylic
Size: 7"D


DO NOT REMOVE OR CUT
THE ACRYLIC WNDOW.
This window will need
to be blank acrylic
(like vote panels)
Spheres, Hamburger Buns and Parachutes
Changes in raindrop shape within six hundredths of a second.
QTY: 1
1/4" acrylic
Size: 33"D


Wind Limitations
Those Not-So-Crazy Greeks
The first known rainfall record keepers were the ancient Greeks. Records date back to 500 B.C.
2.625"D Hole-
REMOVE ACRYLIC
Temperature Limitations
Pluviometer or Udometer
Now you know the scientific names for rain gauge.
Rain Gauge
Current Annual Rainfall JANUARY - PRESENT
QTY: 1
1/4" acrylic
Size: 23.9375"D



Rainkeepers" Gallery exhibit

Rainkeepers" Gallery exhibit

Rainkeepers - Zone 1

Pervious Concrete

What it does: stores and returns water to ground; filters water and minimizes the amount of nitrogen, phosphorus, pesticides and other pollutants entering James River and Chesapeake Bay.

Pervious concrete area: 2,600 sq. ft.

Gallons filtered per 1" rainfall: 1,623 gals.

Average gallons filtered annually: 69,302 gals.

Science Museum of Virginia

Find out more:
www.smv.org

Rainkeepers - Zone 2

Rain Garden (Bioretention)

What it does: uses vegetation and layers of soil and mulch, rocks, and sand to collect, absorb, and filter stormwater. This reduces stormwater runoff and improves water quality.

Rain Garden (Bioretention) area: 22,945 sq. ft.

Gallons filtered per 1" rainfall: 13,588 gals.

Average gallons filtered annually: 580,208 gals.

Science Museum of Virginia

Find out more:
www.smv.org

Rainkeepers - Zone 3

BayScapes Garden

What it does: uses plants native to the region which do not require pesticides, fertilizers, or irrigation to grow well. Thus, BayScaping eliminates the need of chemical contaminants that contribute to pollution in stormwater runoff.

BayScapes Garden area: 5,120 sq. ft.

Gallons filtered per 1" rainfall: 3,192 gals.

Average gallons filtered annually: 136,286 gals.

Science Museum of Virginia

Find out more:
www.smv.org

Rainkeepers - Zone 4

Tree Well

What it does: collects, stores, and returns water to ground; filters water and minimizes the amount of nitrogen, phosphorus, pesticides and other pollutants entering James River and Chesapeake Bay.

Single tree well area: 4,415 sq.ft.

Gallons filtered per 1" rainfall: 2,620 gals.

Average gallons filtered annually: 111,853 gals.

Science Museum of Virginia

Find out more:
www.smv.org

Rainkeepers - Zone 5

Green Roof

What it does: protects the roof membrane from harsh weather and ultraviolet (UV) radiation. A vegetated or green roof can last twice as long as a traditional roof. Vegetated roofs have a relatively stable surface temperature, remaining at or below air temperature while traditional rooftops can soar up to 90°F above air temperature. (Source: EPA)

Green roof area: 3,597 sq. ft.

Gallons filtered per 1" rainfall: 1,121 gals.

Average gallons filtered annually: 47,877 gals.

Science Museum of Virginia

Find out more:
www.smv.org

Rainkeepers - Zone 6

Rain Barrel

What it does: stores rainwater harvested from a train canopy to supply water for the Green Acre Urban Farm.

Rain barrel harvesting area: 1,600 sq. ft.

Gallons harvested per 1" rainfall: 2,500 gals.

Average gallons filtered annually: this number depends on usage and limited storage capacity of 2,500 gals. per barrel.

Science Museum of Virginia

Find out more:
www.smv.org

Rainkeepers - Zone 7

Irrigation

What it does: irrigates the Green Acre Urban Farm with stored rainwater harvested from a train canopy. The irrigation demonstration is powered by solar energy.

Irrigation area: 5,838 sq. ft.

Gallons irrigated per 1" rainfall: up to 2,500 gals.

Average gallons filtered annually: this number depends on usage and limited storage capacity of 2,500 gals. per barrel.

Science Museum of Virginia

Find out more:
www.smv.org

Rainkeepers" Gallery exhibit


Plastics for Dinner?
SOUTH PACIFIC GYRE
Have you noticed how prevalent plastics are in your daily life?
When you see plastic litter strewn aside highways or sidewalks, or see plastic in over-flowing trash cans, you may not think about how those items can end up in stormdrains, creeks, and rivers. Plastics entering storm sewers or blown into water bodies accummulate in the massive, slow rotating ocean current whirlpools, or gyres. As a result, a plastic soup containing small plastic particles is developing in each gyre of the major oceans. These plastic particles are consumed by fishes and other sea life—which in turn can be injested by humans.
Plastics can move from the Chesapeake Bay to the Atlantic Ocean where water currents carry them to the Sargasso Sea. Over 35,000 floating pellets per square kilometer have been found in the Sargasso Sea. This same ration of plastics was found in the Southern Atlantic. One study found plastic pollution had increased in the south Atlantic by 190% from 1989 to the present.
Plastics make the list twice!
Top 10 Items to Recycle
1. Aluminum
2. PET Plastic Bottles
3. Newspaper
4. Corrugated Cardboard
5. Steel Cans
6. HDPE Plastic Bottles
7. Glass Containers
8. Magazines
9. Mixed Paper
10. Computers
Sea turtles can mistake plastic bags for jellyfish and may choke while attempting to eat them.
Plastic particles found in the ocean resemble colorful confetti. Thousands of these millimeter-sized fragments can emerge in ocean water samples.
Credit: Sea Education Association, Marilou Maglione

The VNEMO Program Manager participated in the Chesapeake Bay Program Goal Implementation Team Four (GIT4) Healthy Watersheds. This working group has brought together the various state Healthy Waters programs and developed communication materials illustrating the location of identified health resources. In addition, the GIT4 hosted a workshop to discuss the protection of resources as a measurable action under the Chesapeake Bay TMDL. The Program Manager worked closely with the VA Chapter of the Nature Conservancy to advance the development of the Virginia program including the beginnings of negotiations to move the program into the VDCR Division of Natural Heritage.

Through this grant period, VCU continued to manage and provide a more user-friendly, updated version of the INSTAR online stream assessment decision support tool to be used by state, regional, and local planners to identify healthy streams and associated living resources within their jurisdiction. INSTAR and the Healthy Waters Program is an Inter-agency partnership led by VDCR, VCU, and VDEQ to identify and maintain watersheds with high ecological integrity. INSTAR is a multi-metric, biological and physical assessment of aquatic resources where field collected data is analyzed and compared against the data density to create a modeled reference condition (Virtual Stream Score) by which all other data is compared. The results of such an analysis produces a result which categorizes such data into Poor, Restorative, and Healthy.

Policy Development

To continue to grow the Virginia Healthy Waters Initiative, the VCU Analyst/HWI Program Manager partnered with the Virginia Chapter of the Nature Conservancy to begin negotiations to move the HWI Program to the most appropriate agency location. Bills were put on the House and Senate floor to merge the DCR Division of Stormwater Management with the VDEQ. Based upon the last several years of successful coordination with both DCR and DEQ, it was clear the program was not of DEQ's highest priority. While supportive of the program, DEQ acknowledged significant growth of the program was necessary. The Program Manager began working with the DCR Division of Stormwater Management and the Division of Natural Heritage to move the program into the VDCR DNH. With the support of the VA Chapter of TNC, the program move was formally initiated in the fall of 2012. The HWI has significant data gaps to fully affect other programs and policies. The most pressing issue is the lack of statewide data demonstrating water resources-based ecological integrity.

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