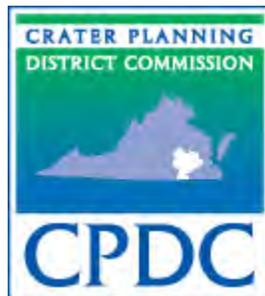


# Virginia Coastal Zone Management Project

## Final Deliverable Products Report Task 42, Technical Assistance Program



**Crater Planning District Commission**

**November 15, 2015**



**Virginia Coastal Zone**  
MANAGEMENT PROGRAM



This project was funded, in part, by the Virginia Coastal Management Program at the Department of Environmental Quality through Grant # NA14NOS4192363 of the U.S. Department of Commerce, National Oceanic and Atmospheric Administration, under the Coastal Zone Management Act of 1972, as amended.

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## **Project Summary**

The Technical Assistance Program includes various activities coordinated and provided by Crater Planning District Commission staff. All work relating to the products listed in the 2014 Virginia Coastal Zone Management Program Grant is summarized below. Any additional environmental tasks completed during the past year have also been outlined.

### Product #1 – Environmental Impact Reviews

Commission staff reviewed 46 Environmental Impact Reports during the past year. The projects were varied and included military applications, a power plant, mining, energy pipelines, a hospital, national wildlife refuges, biosolid applications, water withdrawals, pollution discharge, and grant funding applications.

### Product #2 – Report on Coastal Meetings

Three (3) quarterly meetings were held during the past year (2014 - 2015): February 13, March 19, and June 18. An October meeting was held and will be summarized for the 2015 report. In addition to local government and Crater PDC staff, representatives from the following entities attended at least once: Fort Lee, The Virginia Department of Game and Inland Fisheries, The Virginia Department of Conservation and Recreation, The Virginia Department of Environmental Quality, VCU, and the Friends of the Lower Appomattox River (FOLAR). The Crater PDC hosted a Semi-Annual Coastal PDC meeting on March 10, 2015. It attended the Coastal Partners Workshop on December 10-11, 2014 and the Coastal Policy Team meeting on September 29, 2015.

### Product #3 – Coastal Training

The Commission sponsored several training sessions on the following topics: 1) Appomattox River Recreation and Economic Development, 2) Virginia State Water Resources Plan, 3) Virginia Cultural Resource Information System, 4) Virginia's Draft 2015 Wildlife Action Plan, 5) Activities of FOLAR, 6) Rural Transportation Planning, 7) Appomattox River Interpretive Guide, and 8) VCU Development Tracker.

### Product #4 – FOLAR (Friends of the Lower Appomattox River)

The Commission staff continued its ongoing support for FOLAR by providing financial administration, meeting facilitation, website maintenance ( [www.folar-va.org](http://www.folar-va.org) ), participation in river events, map production, office space, and grants administration. FOLAR performed approximately 5 local clean-ups and planned its 8<sup>th</sup> Annual Battle or Paddle, which was unfortunately cancelled due to severe weather. It also secured approximately \$10,000 in grants from various sources. It continued to employ permanent part-time staff to handle its administrative duties.

### Product #5 – Benefits Accrued From Prior CZM Grants

Commission staff maintained our Appomattox River Interpretive guide and online application: <http://www.craterpdc.org/webmaps/arig/> . A cell phone app was also developed.

### Additional Environmental Matters

Commission staff participated in several other environmental activities including the Richmond Area Environmental Education Network, Chesapeake Bay TMDL Planning, solid waste reporting, the Albemarle-Chowan Roundtable, the Middle James Roundtable, the Chesapeake Conservancy, floodplain analysis, and the Beaches to Bluegrass Trail.

Environmental Impact Review List  
Crater Planning District Commission

<b><u>ID NUMBER</u></b>	<b><u>PROJECT</u></b>	<b><u>LOCATION</u></b>
VA0092797	Atlantic Waste Disposal	Sussex County, VA
PF14-10-000	Transcontinental Gas Pipe Line	Greensville County, VA
VA0028258	Red Hill Utility	Prince George County, VA
VA0027561	The Children's Home of Virginia Baptist	Chesterfield County, VA
VA0073300	James River Genco	Hopewell, VA
DEQ #14-171F	Comprehensive Plan for James River NWR	Prince George County, VA
DEQ #14-194F	2014 Range Complex Master Plan	Fort Lee, VA
VA0082783	Dominion Hopewell Power Station	Hopewell, VA
VA0003255	Georgia-Pacific 2015 Chesapeake Bay Journal Funding Request TASS Training Center	Greensville County, VA  Fort Lee, VA
DEQ #15-002F	Chesterfield Avenue Mixed Use Development Greensville County Sheriff's Office	Chesterfield County, VA Greensville County, VA
DEQ #15-004F	US Department of State, Foreign Affairs Security Training Center	Fort Pickett, VA
VA0081779	Dinwiddie Courthouse STP	Dinwiddie County, VA
VA0028622	Harbour East Village WWTP	Chesterfield County, VA
NOAA 15-018F	NOAA Restoration Center	
DEQ #15-022F	Defense Supply Center	Chesterfield County, VA
VWPP #03-0597	Iluka Old Hickory and Concord Mining Operations Greensville County Courthouse Security Enhancement Project FY 2015 Drinking Water State Revolving Fund Program	Greensville County, VA
VA0092436	Iluka Resources Inc. - Brink Concentrator Plant	Greensville County, VA
VA0061646	Town of Surry WWTF	Surry County, VA
DEQ #15-052F	Kippax Place	Hopewell, VA
DEQ #15-054S	VDOT Surry AHQ Combo Building	Surry County, VA
DEQ #15-058F	St. Francis Medical Office Building	Chesterfield County, VA
DEQ #15-053S	VDOT Stony Creek AHQ Chemical Storage Facility FY2016 - FY2020 Chesapeake Bay Monitoring Program	Sussex County, VA
DEQ #15-076F	Fort Lee 2014 Integrated Wildland Fire Management Plan	Fort Lee, VA
CP15-118-000	Proposed Virginia Southside Expansion Project II	Greensville County, VA
VPA00532	Georgia-Pacific	Greensville County, VA
VPA00522	S. Wallace Edwards & Sons, Inc.	Surry County, VA
VPA00825	Nutri-Blend, Inc.	Dinwiddie County, VA
DEQ #15-119S	Greensville County Power Station	Greensville County, VA
DEQ #15-127F	Columbia Gas	Prince George County, VA
VPA00524	Roxbury Industrial Park WWTF VADEQ FY2016 Water Quality Management Planning Program	Charles City County, VA
DEQ #15-128F	Managing Livestock Predation in the Commonwealth of Virginia	
VPA00843	Synagro Central, LLC	Prince George County, VA
P15-6-000	Atlantic Coast Pipeline	
DEQ #15-020F	Columbia Gas Honeywell State Water Resources Plan	Hopewell, VA
VA0060194	Proctors Creek WWTP	Chesterfield County, VA
DEQ #15-130F	VANG State Headquarters at Defense Supply Center FY 2016 Drinking Water State Revolving Fund Program	Chesterfield County, VA
DEQ #15-147F	Charter Colony Tracts 6 and 7	Chesterfield County, VA

## **Crater Planning Directors Meeting**

**Crater PDC Conference Room  
1964 Wakefield Street  
Petersburg, Virginia**

**Noon, Friday, February 13, 2015**

### **AGENDA**

1. Welcome and Introductions
2. Appomattox River Recreation and Economic Development  
Justin Doyle – Outreach Manager  
James River Association
3. Rural Transportation Planning  
Future Program Activities  
Route 460 Update
4. UDA Planning Grant Assistance  
[http://www.vtrans.org/urban\\_development\\_area\\_technical\\_assistance\\_grant\\_program.asp](http://www.vtrans.org/urban_development_area_technical_assistance_grant_program.asp)
5. Other Local and Regional Planning Issues
6. Next Meeting Date – March 19, 2015
7. Adjournment

Minutes of the Crater Planning Directors meeting held on Friday, February 13, 2015 in the Crater PDC Conference Room, 1964 Wakefield Street, Petersburg, Virginia.

Attendees: Justin Doyle, James River Association; Tim Davey, Timmons; Morgan Ingram, Brian Mancini, Dinwiddie County; Karen Epps, Colonial Heights; Matt Rowe, Charles City County; Douglas Miles, Prince George County; Fritz Brandt, Fort Lee; Kathleen Morgan, Reginald Tabor, Petersburg; Tevya Griffin, Hopewell; John Watt, Mike Golden, Heather Barrar, Chesterfield County; Wayne Walton, Debbie Newman, Ken Newman, Delores Lee, John McEwen, Wendy Austin, FOLAR; Mark Bittner, Crater PDC.

### Welcome and Introductions

Mark Bittner called the meeting to order at 12:10 p.m.

### Appomattox River Recreation and Economic Development

Mr. Doyle of the James River Association presented information on a planning effort to make rivers in the Richmond/Tri-Cities area even better places to work and play. The plan would focus on promoting public access and economic development along the Appomattox, James, Chickahominy, and Pamunkey Rivers.

Several attendees commented on issues specific to the Appomattox River, including the following statements:

- The water level of the Appomattox is often too low. Perhaps more water could be released from Lake Chesdin.
- Joining of trails and access on both sides of the river should be considered.
- Petersburg is interested in dredging the river.
- Better direction should be established for Ferndale Park.

Mr. Doyle stated the planning process should be complete by July 2015.

### Rural Transportation Planning

Mr. Bittner gave a brief update on current Rural Transportation activities for 2015. Mr. Bittner stated the Rural Work Program had also been completed.

### UDA Planning Grant Assistance

Mr. Bittner shared website information for localities looking for grant assistance in establishing Urban Development Areas (UDAs) within their jurisdictions:

[http://www.vtrans.org/urban\\_development\\_area\\_technical\\_assistance\\_grant\\_program.asp](http://www.vtrans.org/urban_development_area_technical_assistance_grant_program.asp)

Other Local and Regional Planning Issues

No other issues were discussed.

Next Meeting Date

The next meeting was tentatively scheduled for March, 2015.

Adjournment

The meeting was adjourned at approximately 1:45 p.m.

## **Crater Planning Directors Meeting**

**Crater PDC Conference Room  
1964 Wakefield Street  
Petersburg, Virginia**

**Noon, Thursday, March 19, 2015**

### **AGENDA**

1. Welcome and Introductions
2. Virginia State Water Resources Plan (SWRP)  
Tammy Stephenson – Program Coordinator, Virginia DEQ  
Office of Water Supply
3. VCU Development Tracker Status Report  
Tom Jacobson
4. Rural Transportation Planning  
Future Program Activities
5. Virginia Cultural Resource Information System (VCRIS)  
Online Access
6. Other Local and Regional Planning Issues
7. Next Meeting Date – June, 2015
8. Adjournment

Minutes of the Crater Planning Directors meeting held on Thursday, March 19, 2015 in the Crater PDC Conference Room, 1964 Wakefield Street, Petersburg, Virginia.

Attendees: Tammy Stephenson, Craig Nicol, Virginia DEQ; Mark Bassett, Dinwiddie County; Scott Davis, Colonial Heights; Glen Gibson, Greensville County; Douglas Miles, Chip England, Prince George County; Rashad Gresham, Steven Hicks, GaJuan Clarke Petersburg; Jeanie Grandstaff, Hopewell; Jeff Franklin, Chesterfield County; Linwood Pope, Tom Delbridge, Emporia; Tom Jacobson, James Newman, VCU; Mark Bittner, Crater PDC.

### Welcome and Introductions

Mark Bittner called the meeting to order at 12:10 p.m.

### Virginia State Water Resources Plan (SWRP)

Ms. Stephenson presented information on the SWRP including information specific to the Crater PDC. The purpose of the SWRP is to analyze the expected cumulative impacts of future water demands on streamflows and groundwater resources. Ms. Stephenson said the Crater PDC is expected to increase in population and alternative sources of water may need to be found.

### VCU Development Tracker Status Report

Mr. Jacobson presented information on the first annual report for the VCU Development Tracker. VCU was still attempting to acquire missing data for some localities. The Crater PDC offered to assist. An attendee also asked that the report be placed on the PDC's website. Mr. Jacobson stated future study would focus on the number of multi-family dwelling units.

### Rural Transportation Planning

Mr. Bittner stated the Rural Work Program would soon be submitted to VDOT.

### Virginia Cultural Resource Information System (VCRIS)

Mr. Bittner stated the Crater PDC had purchased access to the VCRIS website for research on archaeological and architectural features in Virginia. Localities would have access to this same information through the PDC.

### Other Local and Regional Planning Issues

No other issues were discussed.

Next Meeting Date

The next meeting was tentatively scheduled for June, 2015.

Adjournment

The meeting was adjourned at approximately 1:45 p.m.

## **Crater Planning Directors Meeting**

**Crater PDC Conference Room  
1964 Wakefield Street  
Petersburg, Virginia**

**Noon, Thursday, June 18, 2015**

### **AGENDA**

1. Welcome and Introductions
2. Virginia's Draft 2015 Wildlife Action Plan  
Chris Burkett – Wildlife Action Plan Coordinator, Virginia  
Department of Game and Inland Fisheries
3. Appomattox River Interpretive Guide - Update  
Mark Bittner
4. Rural Transportation Planning  
Future Program Activities
5. Other Local and Regional Planning Issues
6. Next Meeting Date – September, 2015
7. Adjournment

Minutes of the Crater Planning Directors meeting held on Thursday, June 18, 2015 in the Crater PDC Conference Room, 1964 Wakefield Street, Petersburg, Virginia.

Attendees: Chris Burkett, Virginia DGIF; Mark Bassett, Dinwiddie County; Douglas Miles, Prince George County; Michelle Peters, Petersburg; Horace Wade, Hopewell; Wendy Austin, FOLAR; Fritz Brandt, Dana Bradshaw, Fort Lee; Mark Bittner, Crater PDC.

### Welcome and Introductions

Mark Bittner called the meeting to order at 12:10 p.m.

### Virginia's Draft 2015 Wildlife Action Plan

Mr. Burkett presented information on the update to Virginia's Wildlife Action Plan. The last update was completed in 2005. The purpose of the Plan is to prioritize efforts to better manage and conserve Virginia's natural resources. Mr. Burkett presented information specific to the Crater PDC including a list of priority species present in the area.

### Appomattox River Interpretive Guide (ARIG)

Mr. Bittner discussed the update to the ARIG and presented a list of changes relative to the previous 2013 version. He asked for comments and suggestions and stated the new version would soon be printed.

### Rural Transportation Planning

Mr. Bittner stated the Rural Transportation Priority List had been submitted to VDOT. It was the same list as the one submitted in 2014.

### Other Local and Regional Planning Issues

No other issues were discussed.

### Next Meeting Date

The next meeting was tentatively scheduled for October, 2015.

### Adjournment

The meeting was adjourned at approximately 1:45 p.m.

# **Leveraging the Appomattox River:**

*A proposal to develop a regional plan for recreation and economic development on the Appomattox River*

**June 27, 2014**

## 1. Introduction

The James River Association was established in 1976 as the Lower James River Association in response to the pollution concerns of a group of citizens living along the James River. In the mid-1990s the organization's name was changed to the



James River Association (JRA) to reflect JRA's programmatic presence throughout the James River watershed. JRA is member-supported nonprofit organization that works to conserve the James River and its tributaries, including the Appomattox River. The organization takes action to promote conservation and responsible stewardship through advocacy, education, outreach, Riverkeeper, and watershed restoration programs.

In partnership with National Geographic and Chesapeake Conservancy, the James River Association (JRA) is collaborating with local partners throughout the James River watershed to connect communities to the James River and its tributaries by developing heritage and recreation corridors. These corridors are comprised of public river access sites, a cohesive network of land and water trails, lodging accommodations including campgrounds and primitive camping options, and historic sites. The vision for this heritage and recreation corridor is the result of outreach efforts associated with the *Envision The James* initiative, a collaborative effort to encourage conservation and increase opportunities for river recreation in the James River watershed.



The heritage and recreation corridor vision is the result of public outreach efforts that occurred throughout the watershed in 2012 and 2013. Residents of the James River watershed overwhelmingly desire increased opportunities for land and river recreation along the James River and its tributaries. In the Petersburg area, the corridor would focus on the Appomattox River and build on efforts that have already been initiated.

## 2. Project Need and Approach

To enhance the heritage and recreation corridor of the Appomattox River, JRA and Timmons Group, a renowned planning and engineering firm in Central Virginia, propose developing a regional recreation and economic development plan with the following goals in mind:

- **Improve quality of life in the Petersburg area by increasing access to the Appomattox River and creating new opportunities for recreation**
- **Create opportunities for river-based economic activity**

Central Virginia benefits from river-based tourism, recreation, and events associated with the region's rivers. The Richmond Region in particular has experienced an increase in river-centric events in recent years. These events attract thousands of tourists to the region resulting in increased in economic activity and improved quality of life for residents. JRA confidently believes the proposed plan will identify strategies for replicating recent successes of the Richmond Region in the Petersburg area.



The Cameron Foundation's primary purpose is to support programs and activities that **improve both the health and quality of life** for people living in Petersburg, Colonial Heights, Hopewell; and the counties of Dinwiddie, Prince George, and Sussex; and the portion of Chesterfield County lying south of Route 10. The scope of the regional recreation and economic development plan will include these localities and focus on the Appomattox River corridor. The planning process will be conducted jointly by JRA and Timmons Group. Stakeholder organizations, including **Historic Petersburg Foundation** and **Friends of the Lower Appomattox River (FOLAR)**, as well as localities will be engaged during the development of the plan. The planning team will provide opportunities for broader public engagement. The planning team will meet with community leaders, collect existing studies and plans, then facilitate an initial public meeting to publicly launch this project.

The goal of the first meeting is to illustrate present thinking about the Appomattox River and economic development in the Petersburg area to stimulate a discussion about the suitable and lasting uses of the river. Timmons Group will showcase study imagery from around the country to encourage creativity based on the positive experiences of others. The community meeting will conclude with an outline for next steps, including the opportunity to review preliminary findings electronically and comment online.

The planning team will review input received from the public and synthesize it with existing plans and regional economic development data including:

- **2013 *Comprehensive Economic Development Strategy* authored by the Crater Planning District Commission**

- **Comprehensive plans, master plans, and other relevant land use studies in the Appomattox River corridor**

Timmons Group will look for opportunities where public investment does not rely solely on quality of life improvements. The planning team intends to identify entrepreneurial ventures that produce a financial return on investment, creating energy and enthusiasm for others.

The James River Association recently partnered with Timmons Group on a similar regional recreation and economic development plan for the Richmond region as part of the Capital Region Collaborative. The goal of the plan for the Richmond Region is to identify opportunities for recreation and economic development within the river corridor of the Richmond region. JRA and Timmons Group propose developing a similar plan for the Appomattox River corridor by working with the Crater Planning District Commission, local governments, business interests, and organizations in the Petersburg area.

The proposed plan will require a planning process of six to nine months. The planning process will commence immediately following the execution of a contract with Timmons Group in October 2014 and conclude in July 2015. JRA will provide adequate staffing and leadership to engage localities and partners in the development of the plan, and ensure the development of the plan is on schedule.

Implementation of the plan will commence after the plan is developed, presented, and widely adopted by localities in the Petersburg area.



### **3. Evaluation of Plan Implementation**

JRA will be responsible for ensuring the plan is developed in a timely manner. After the plan is developed, JRA will identify appropriate partners and funding sources to implement the plan. JRA will work with localities and stakeholders to garner resources necessary to implement the recommendations of the plan which will include the identification of opportunities for:

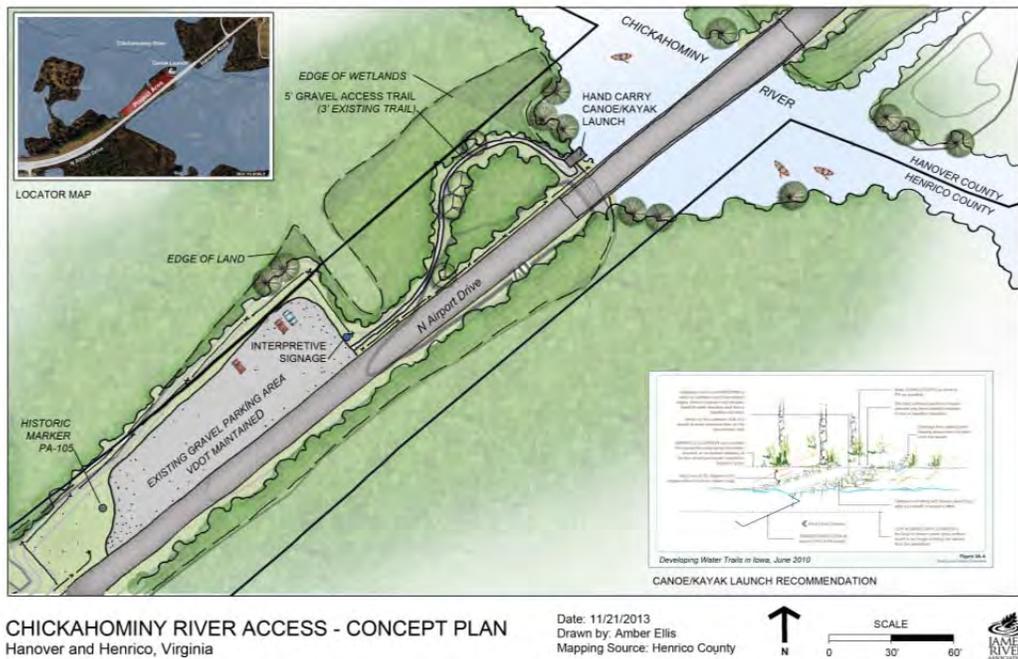
- **Business development**
- **Public river access**
- **Events and celebrations**
- **Education and interpretation**

Short-term results of plan implementation will be measured by the number of successfully completed projects recommended by the plan. Long-term results of plan implementation include new and sustained business development activity in the river corridor, increased visitation to parks and trails, and an increase in revenue for Petersburg area localities from new business activity.

JRA is currently involved in the implementation of the Richmond Riverfront Plan and James River Segment Plan of the Captain John Smith Chesapeake National Historic Trail. JRA maintains strong partnerships with local governments throughout the James

River watershed including the Petersburg area. In addition to local government partnerships, JRA works with federal and state agencies, nonprofit organizations, and businesses to achieve shared goals. JRA is currently working with the National Park Service, Virginia Department of Transportation, and Henrico County to develop a public river access site on the Chickahominy River (see Figure 1).

**Figure 1: Chickahominy River Access – Concept Plan**



# State Water Resources Plan and Water Supply Planning in the Crater PDC Region

March 19, 2015



# Presentation Topics

Local and  
Regional Water  
Supply Plans

State Water  
Resources Plan

Cumulative  
Impact  
Analysis

Water Demand  
and Statement  
of Need

2015 General  
Assembly

Path Forward

# How Did We Get Here?

- 1999-2002 Drought
- Water Supply Plan Development; Compliance
- Collaborative effort – locality, region, state
- Continuous Comprehensive Planning Process
- Informs the permitting process

# Compliance Conditions; Data Needs

- Design capacity
- Information for private water systems
- Improved agricultural use data
- Improved water conservation efforts as part of water demand management
- Well construction information

# Major River Basins

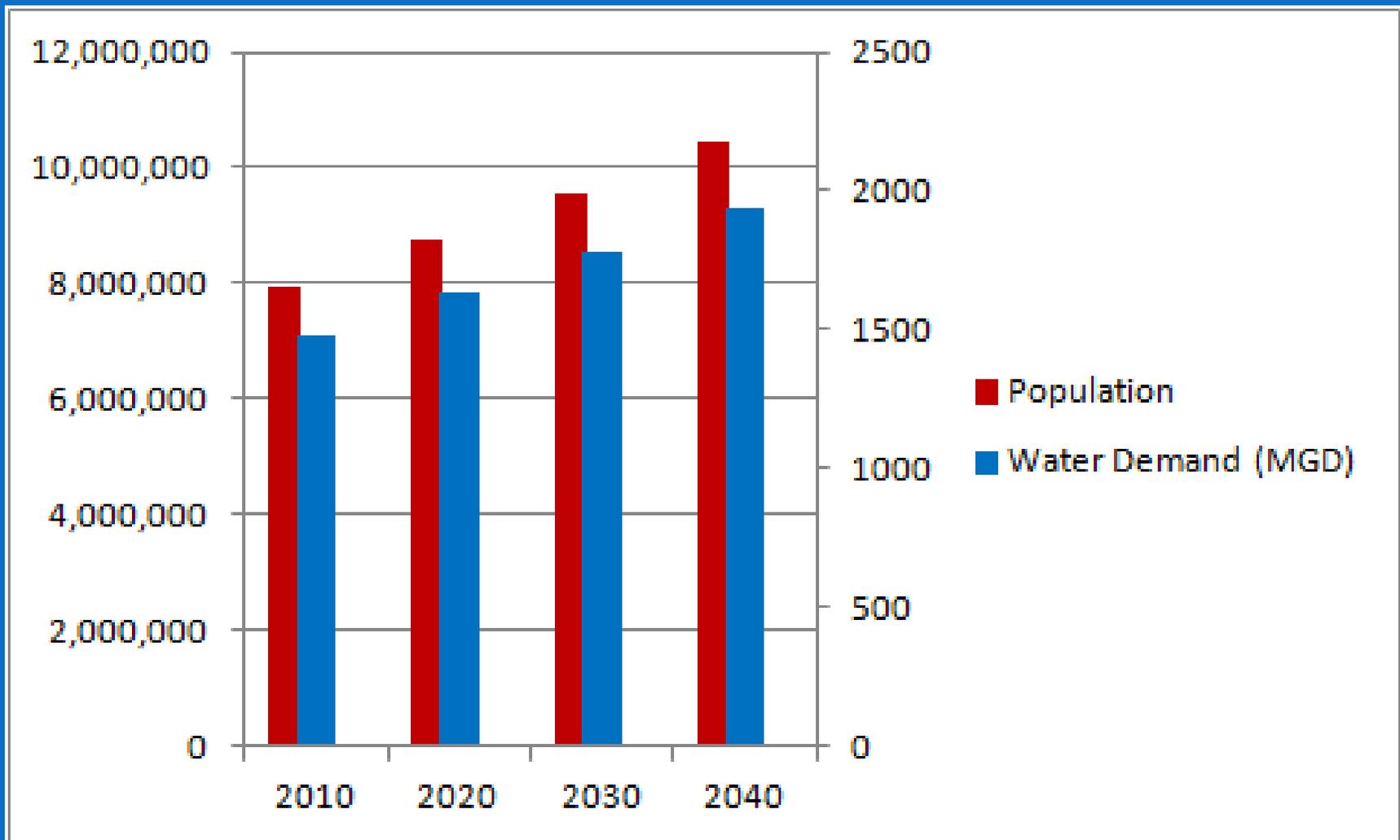


Created By: Previn D. Smith  
Date: April 4, 2014

# State Water Resources Plan

- SWRP includes information from all water supply plans, as well as information from other sources
- For the first time, we can analyze the expected cumulative impacts of future water demands on streamflows and groundwater resources
- DEQ will follow up with localities whose projected demand is anticipated to impact beneficial uses

# VA Population and Water Demand Trends



## What the SWRP Tells Us

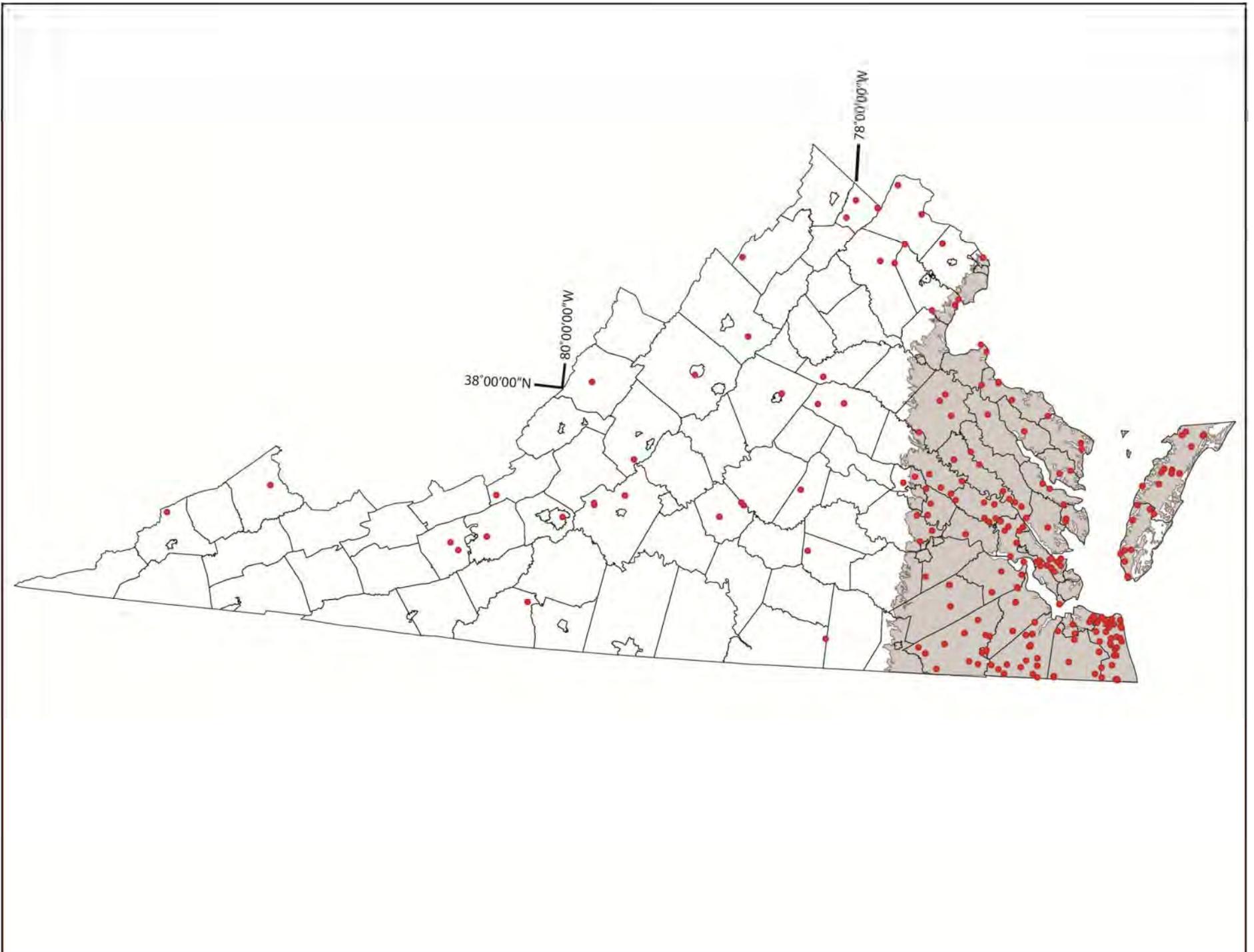
- Approximately 450 MGD water needed to meet 2040 projected demand
- Plans predict that approximately 77% will be from surface water
- Concentration of Demands: 97% of surface water withdrawals are predicted to occur in 25% of stream reaches

# Challenges and Recommendations

- Understanding the Impact of Unpermitted Water Withdrawals
  - 82% total surface water withdrawn excluded from permitting (2013)
  - Not subject to permit conditions that require conservation during times of low flow

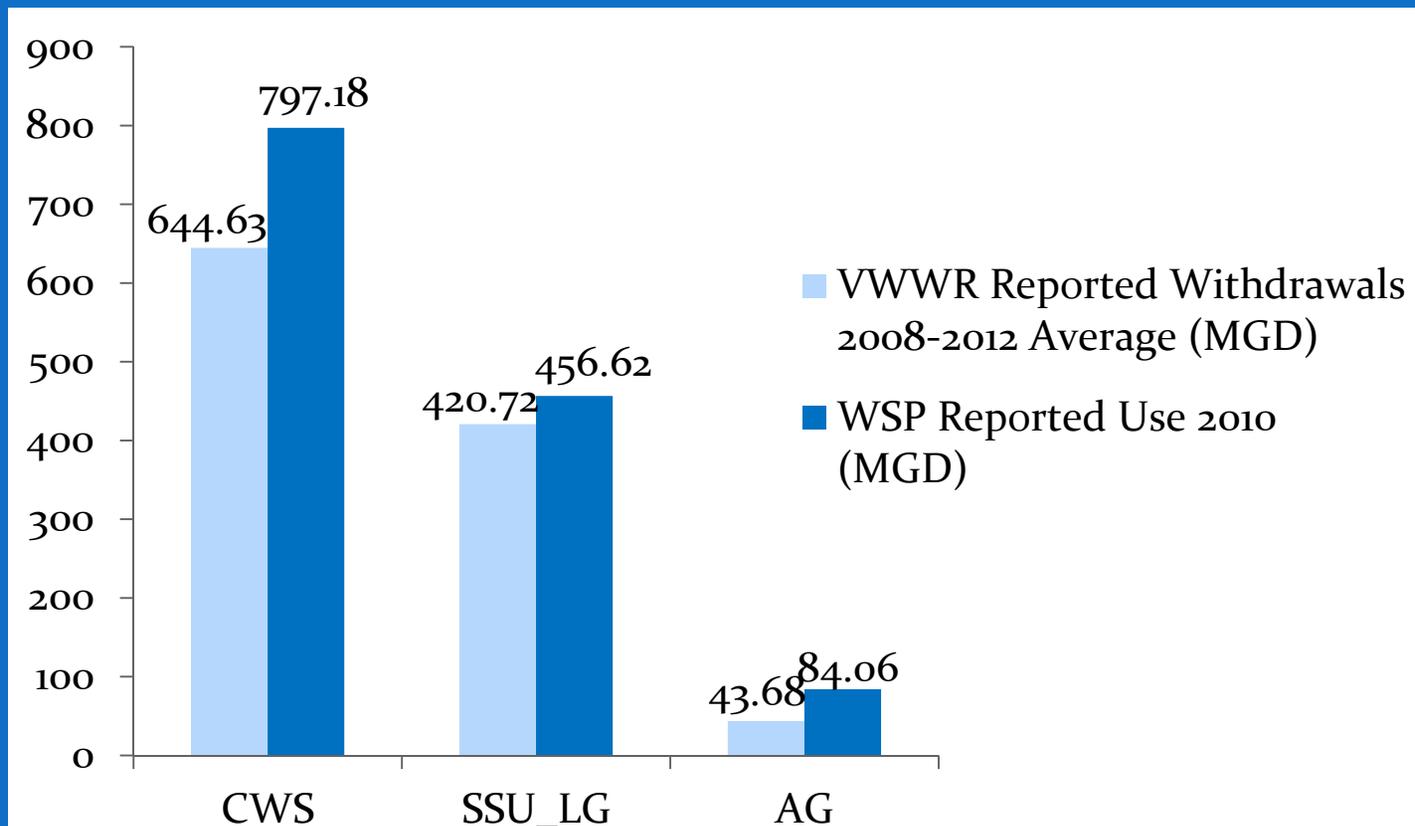
# Challenges and Recommendations

- Quantifying Current and Future Risks to Groundwater Availability Outside of Current Groundwater Management Areas

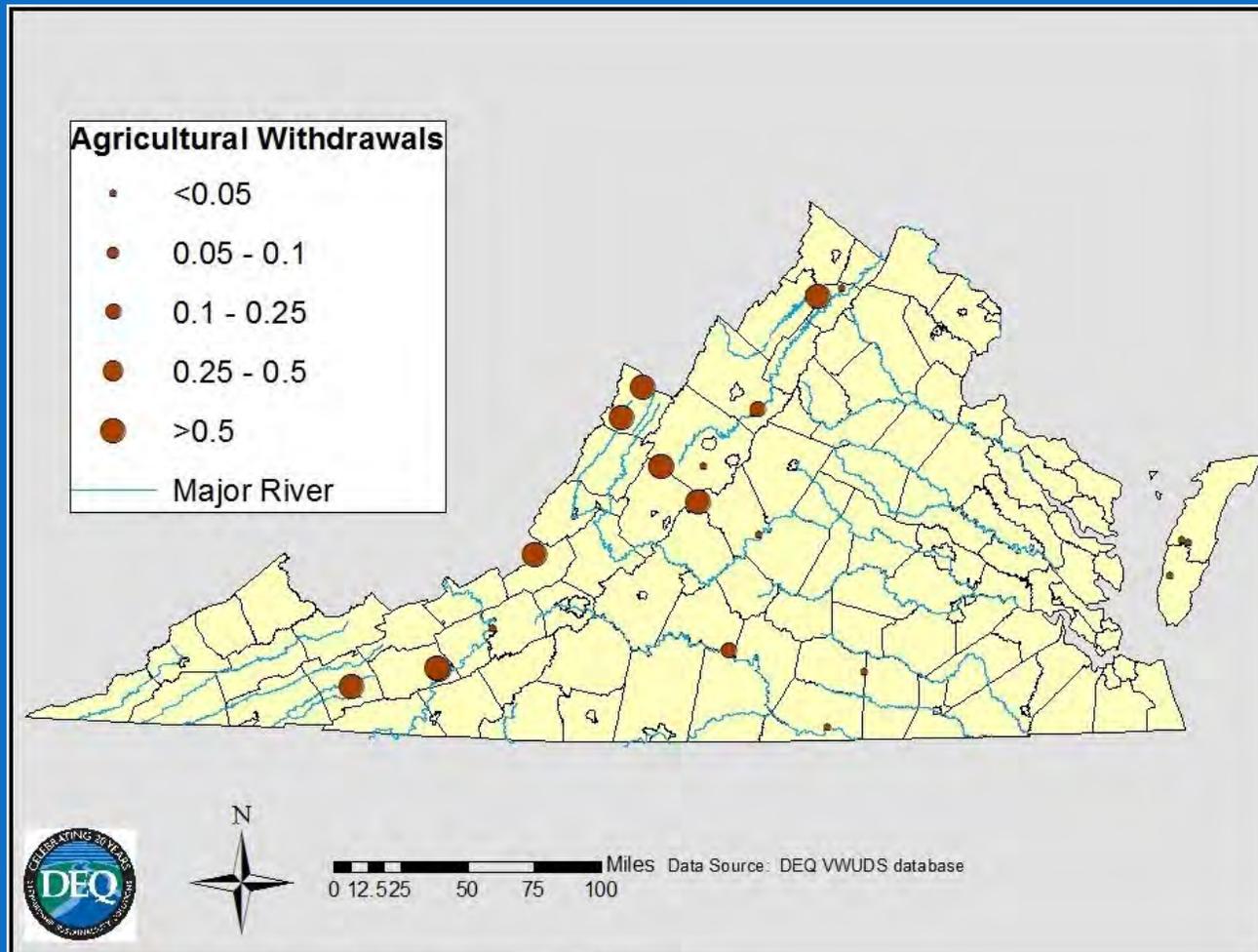


# Challenges and Recommendations

- Gaps in Water Withdrawal Reporting, Differences in Reporting Thresholds between WSP and VWWR Regulations; Lack of Adequate Data

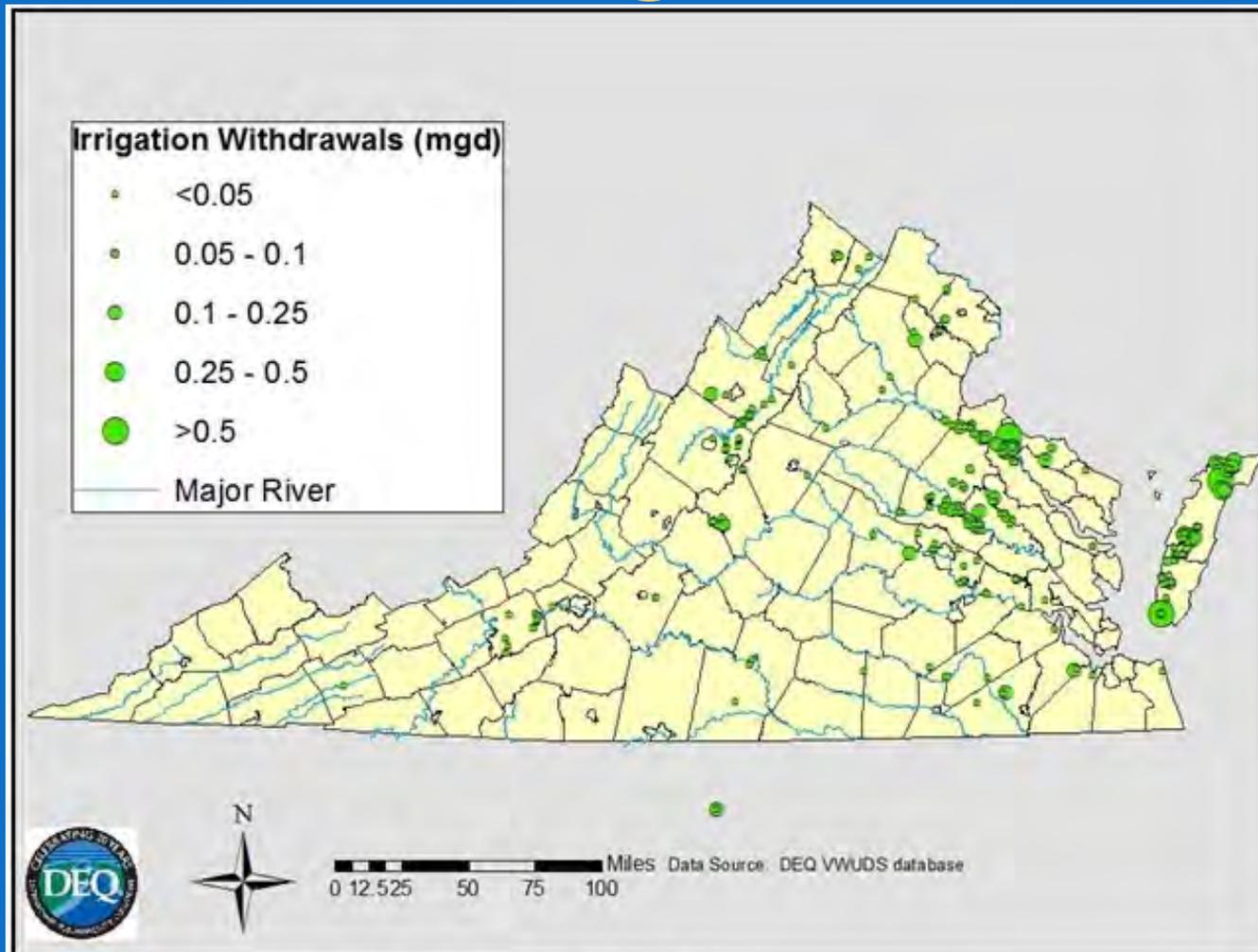


# Agricultural Water Withdrawals in Virginia (MGD)



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# Irrigation Water Withdrawals in Virginia



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# Challenges and Recommendations

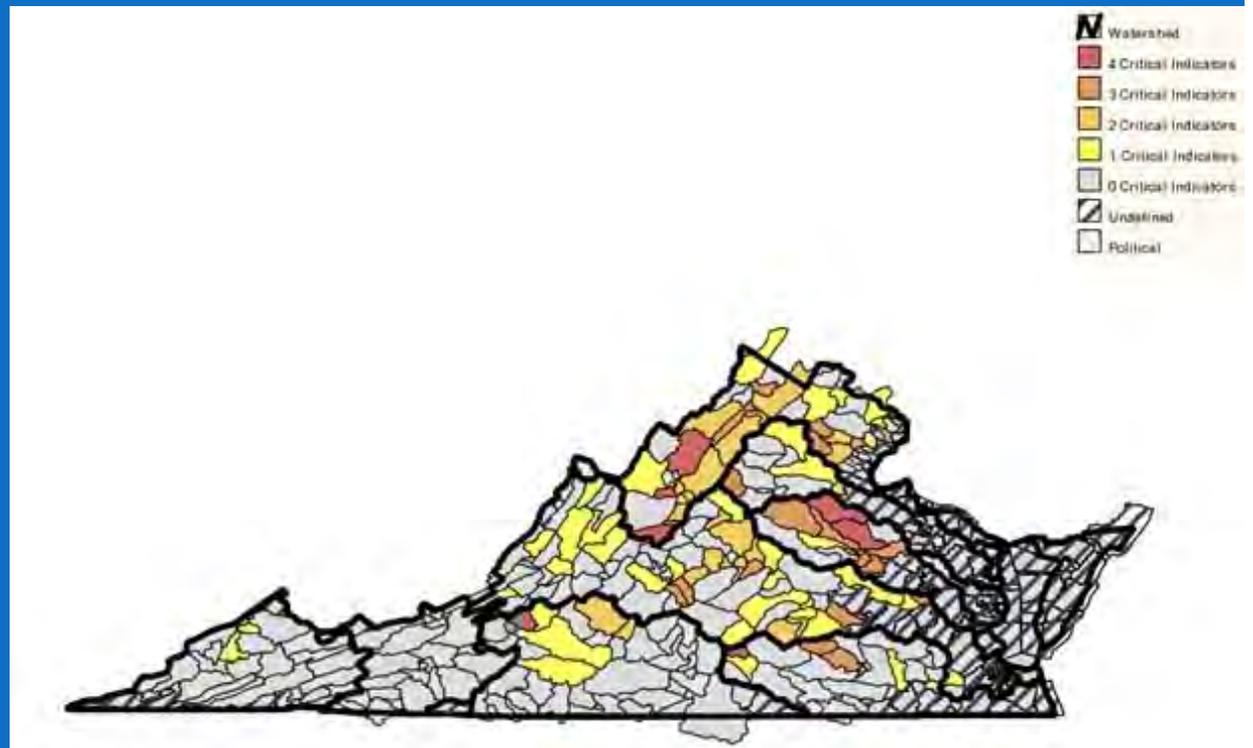
- Reservoir Site Development
- Threats to Water Quality
- Understanding the Impact of Consumptive Use on Water Supply
- Promoting Increased Conservation to Reduce Long-Term and Short-Term Demand

# Challenges and Recommendations

- Critical Infrastructure Deficiencies
- Seal Level Rise, Changes in Precipitation Patterns, and Land Subsidence
- Source Water Protection
- Conflict Resolution
- Public Education and Outreach

# Surface Water Withdrawals: Quantifying Potential Impacts

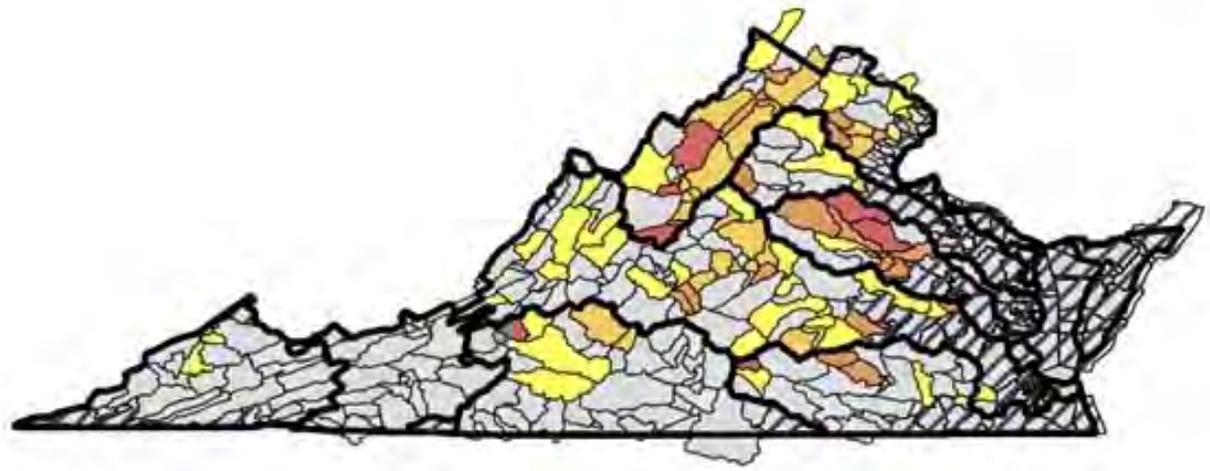
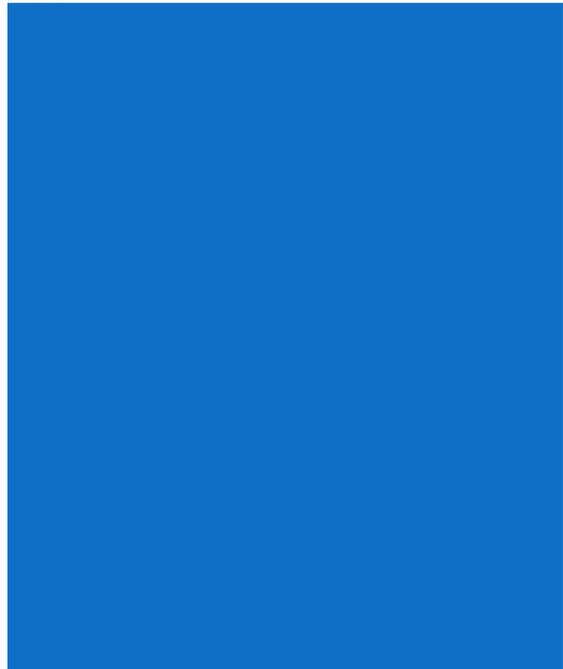
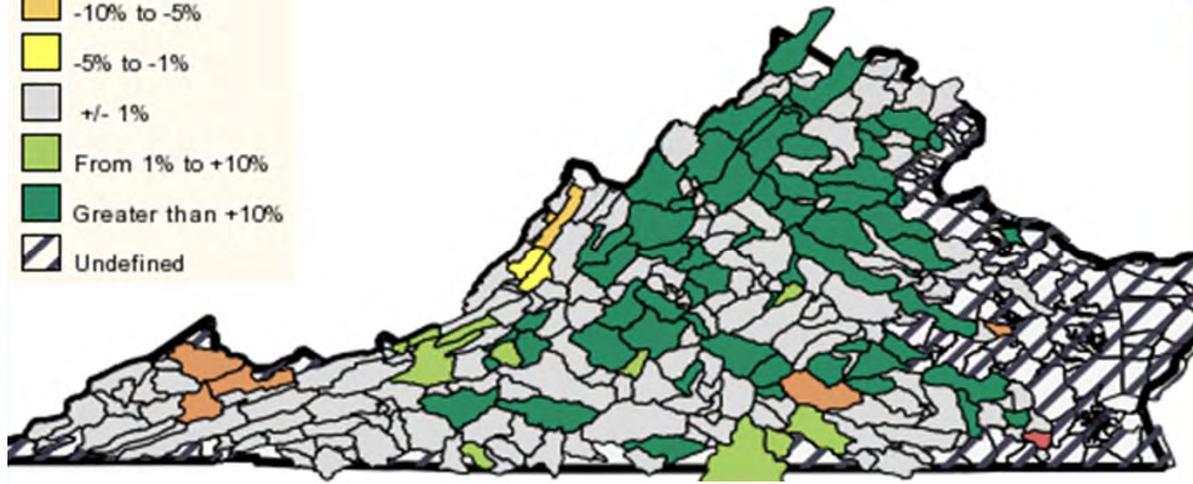
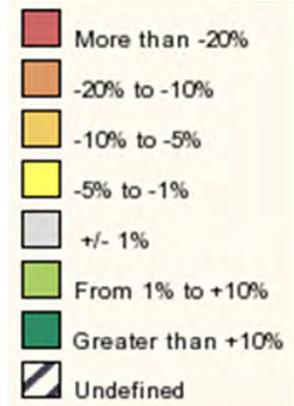
- Four Metrics:
  - August Low Flow – Biodiversity
  - 7Q10 – Water Quality Impacts/Waste Assimilative Capacity
  - Change in Drought of Record Flow – Safe Yield
  - Withdrawal as Percentage of September Drought Warning – Overall System Stress



Stream reach considered at risk based on exceedance of screening thresholds

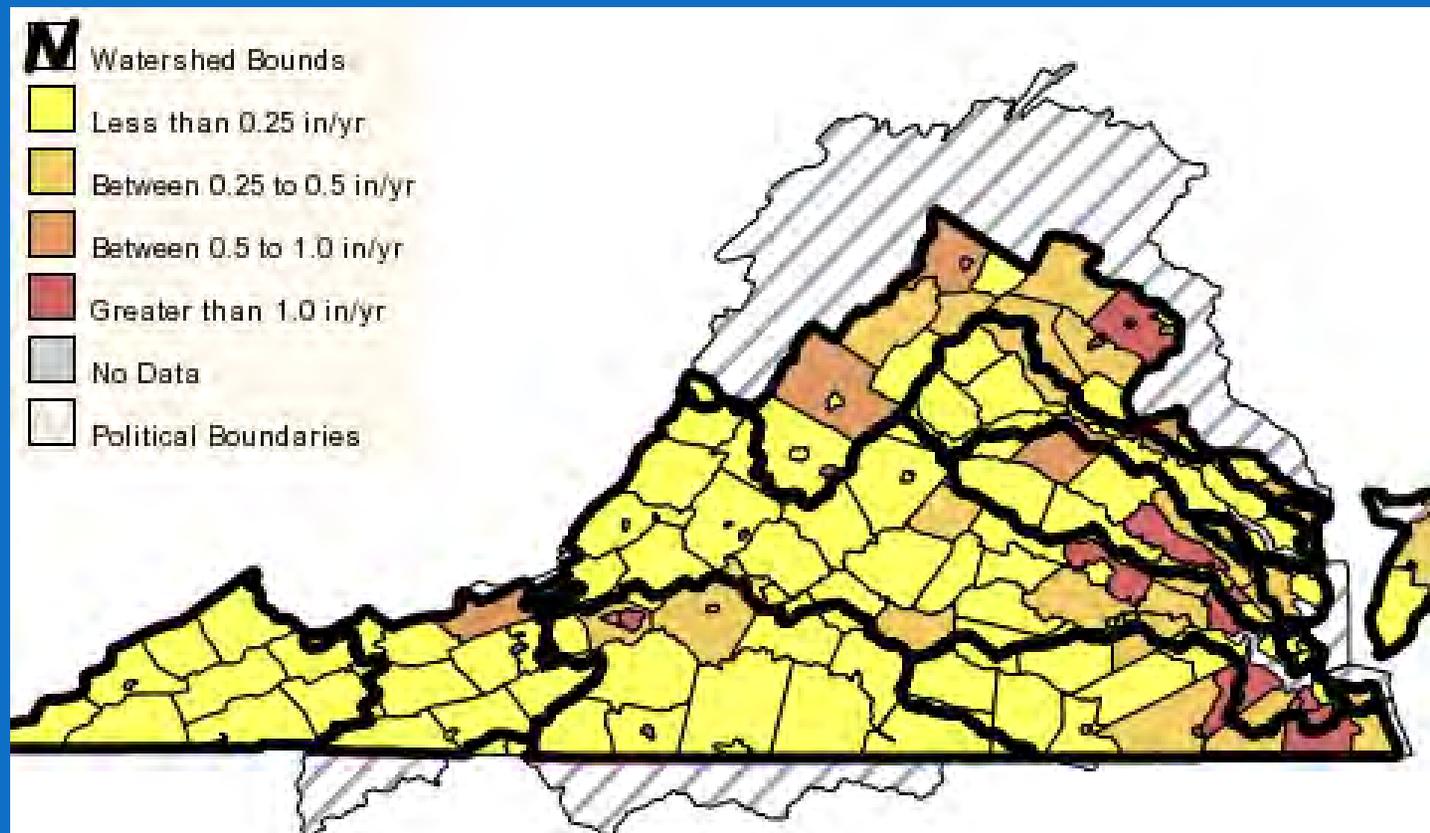
# Projected Change in Daily Withdrawal from Surface Waters in Non-tidal Watersheds



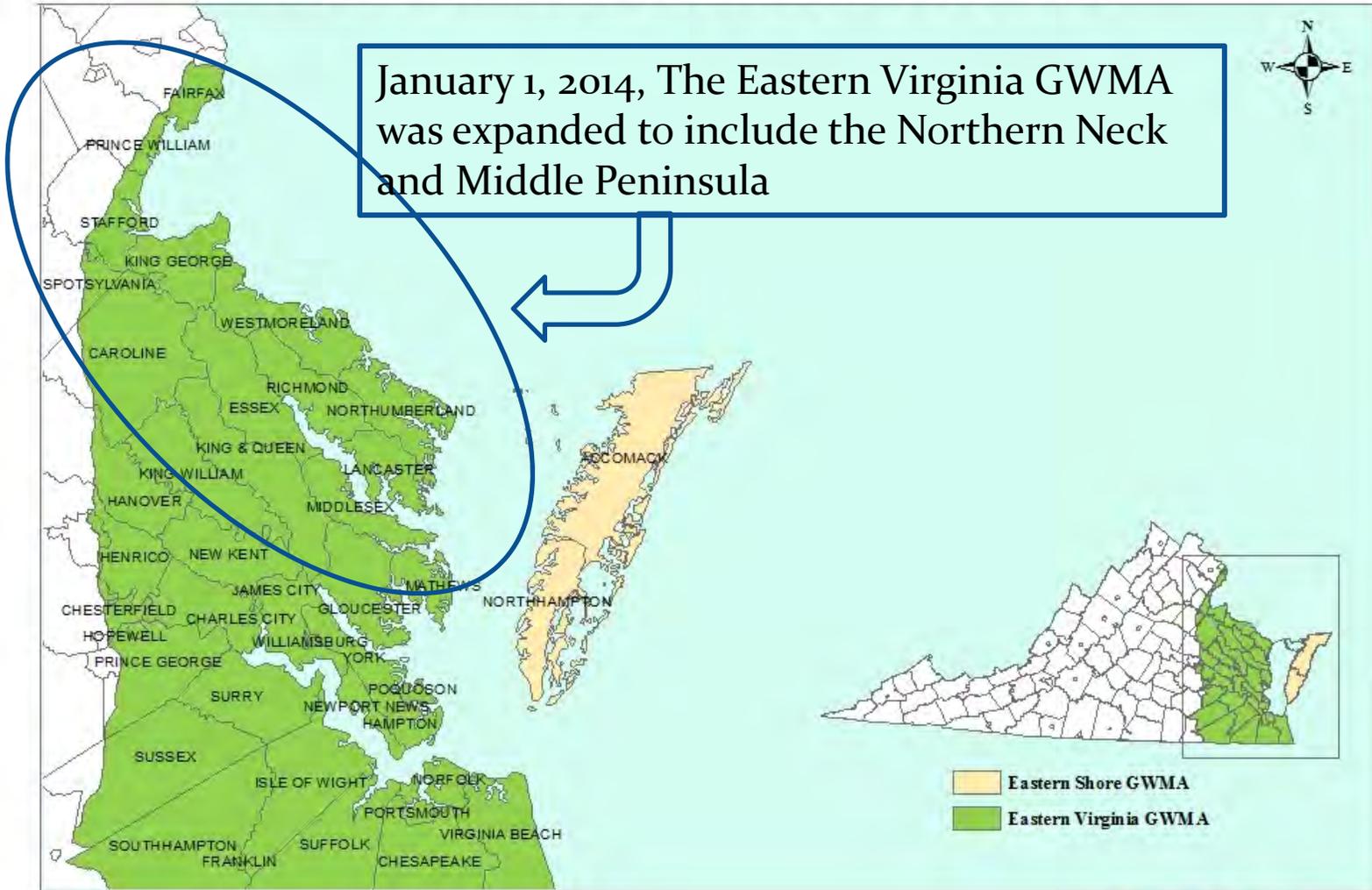


# Groundwater Withdrawals

- 23% of total water demand is expected to come from GW
- 75% of GW demand outside established GWMA



# COMMONWEALTH OF VIRGINIA GROUNDWATER MANAGEMENT AREAS (GWMA)



Effective: January 1, 2014  
Prepared By: Virginia Department of Environmental Quality  
Groundwater Withdrawal Permitting Program



# Who Needs a Permit?

ANY user in a Groundwater Management Area  
whose groundwater withdrawals exceed 300,000  
gallons in any month

\*(Well or Well System – Facility/Owner)\*

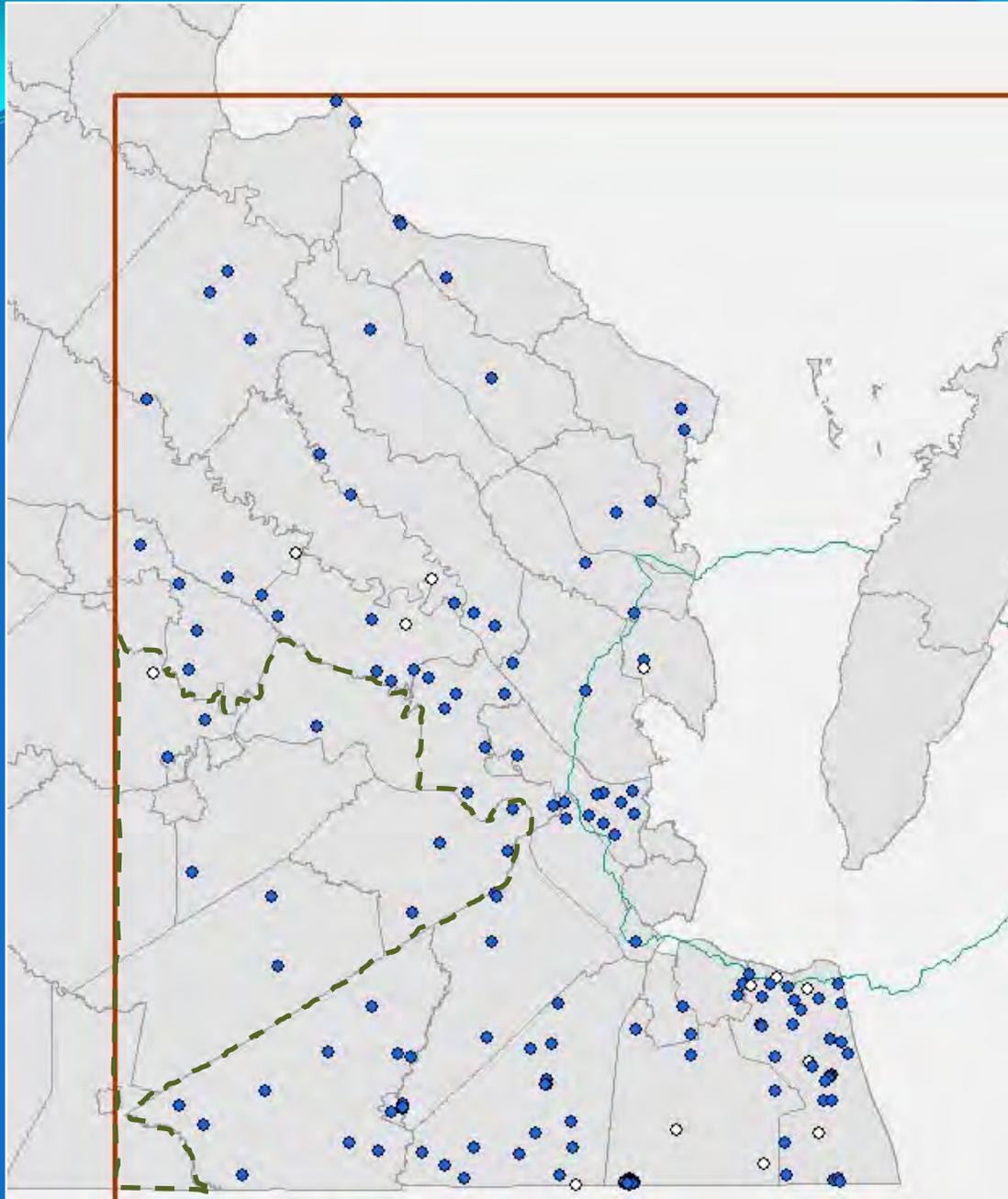
300,000 gallons equates to:

Approximately 1” of irrigation applied  
over 11 acres

Or

Operation of a well with a  
125-gpm yield for 40 hours



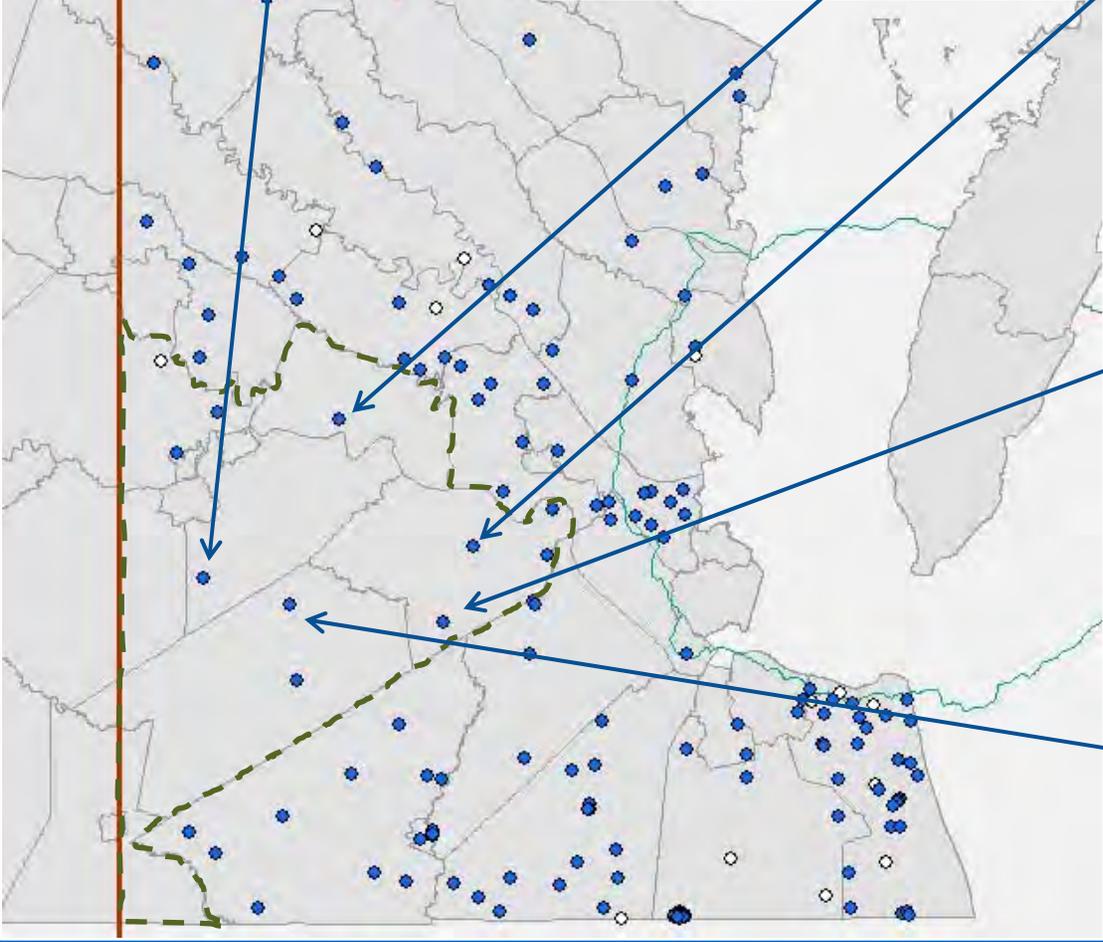
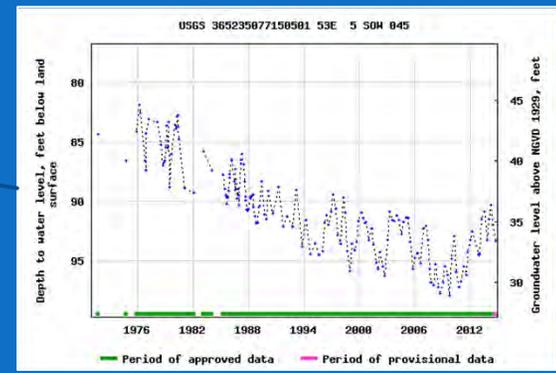
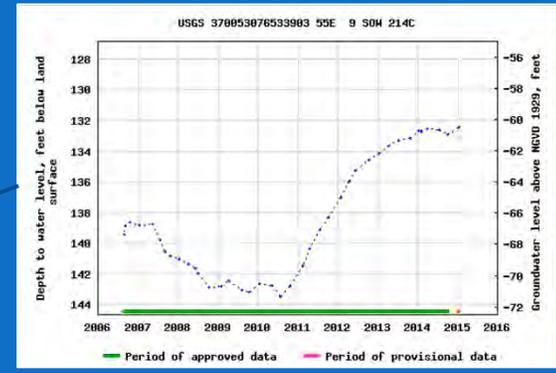
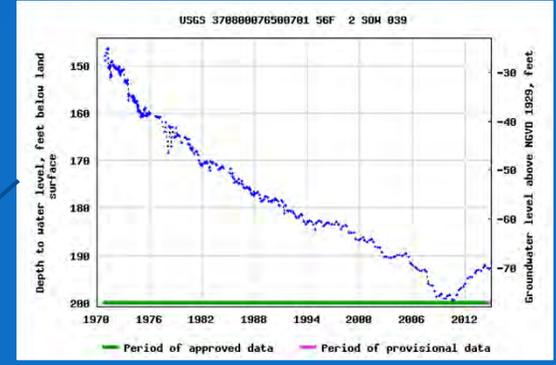
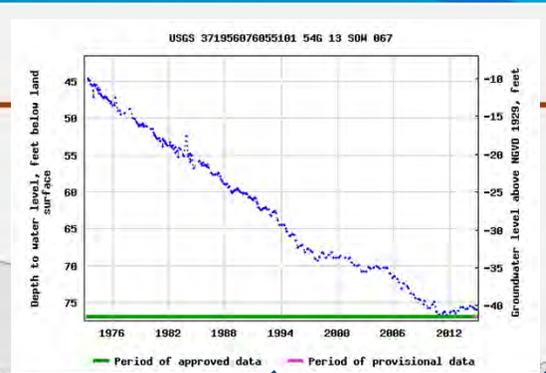
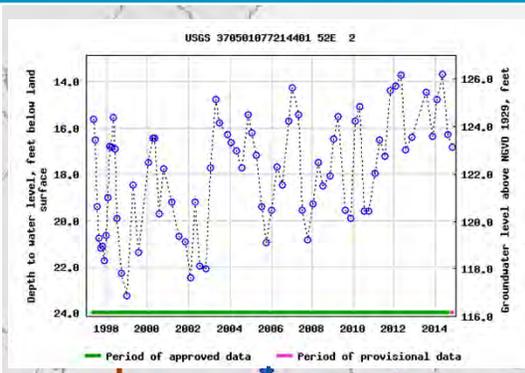


## Monitoring Well Locations

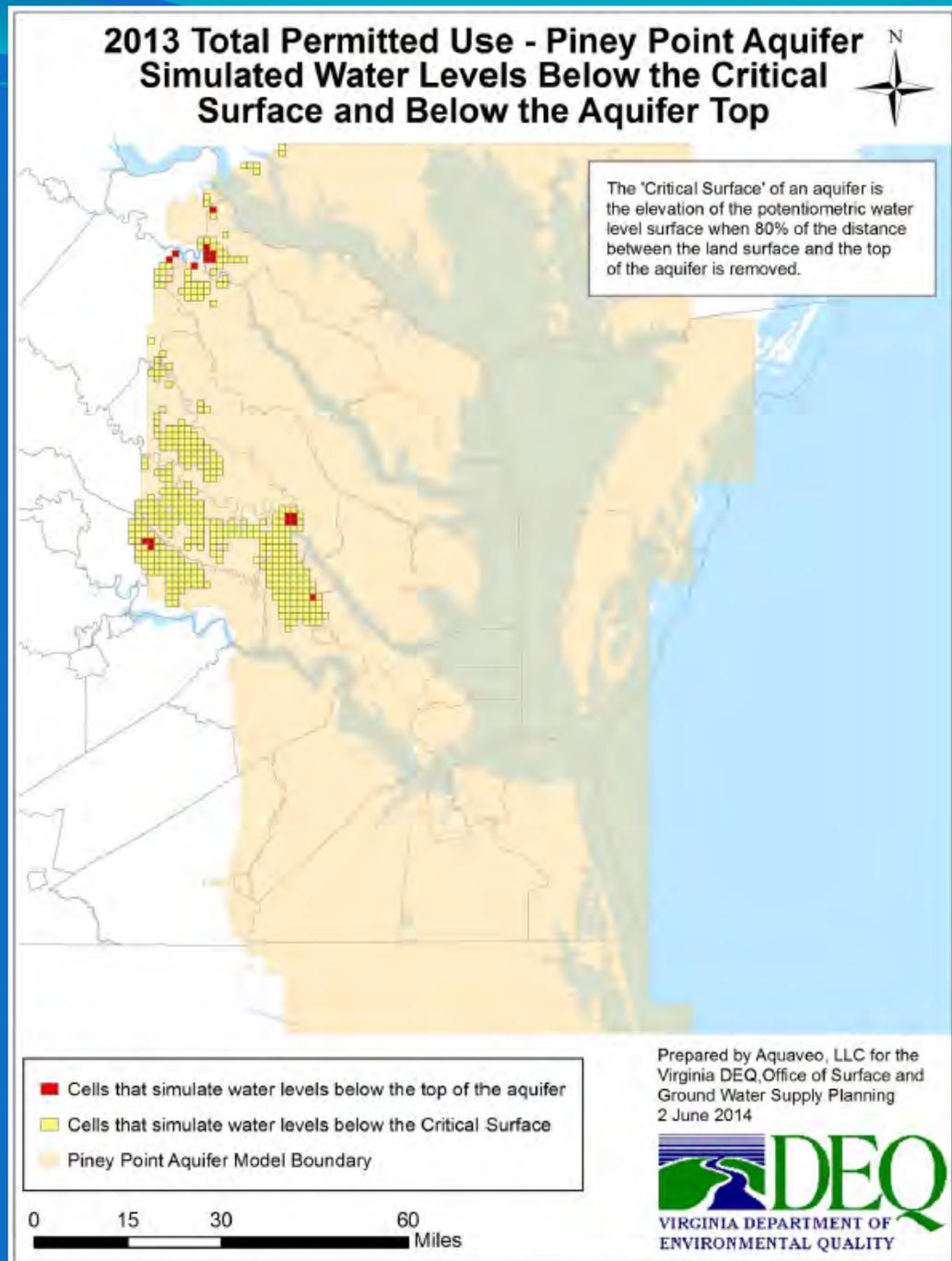
These wells have:

- Water level measurements in USGS NWIS system
- One water level measurement
- Known locations and land surface elevations
- Known screen elevations

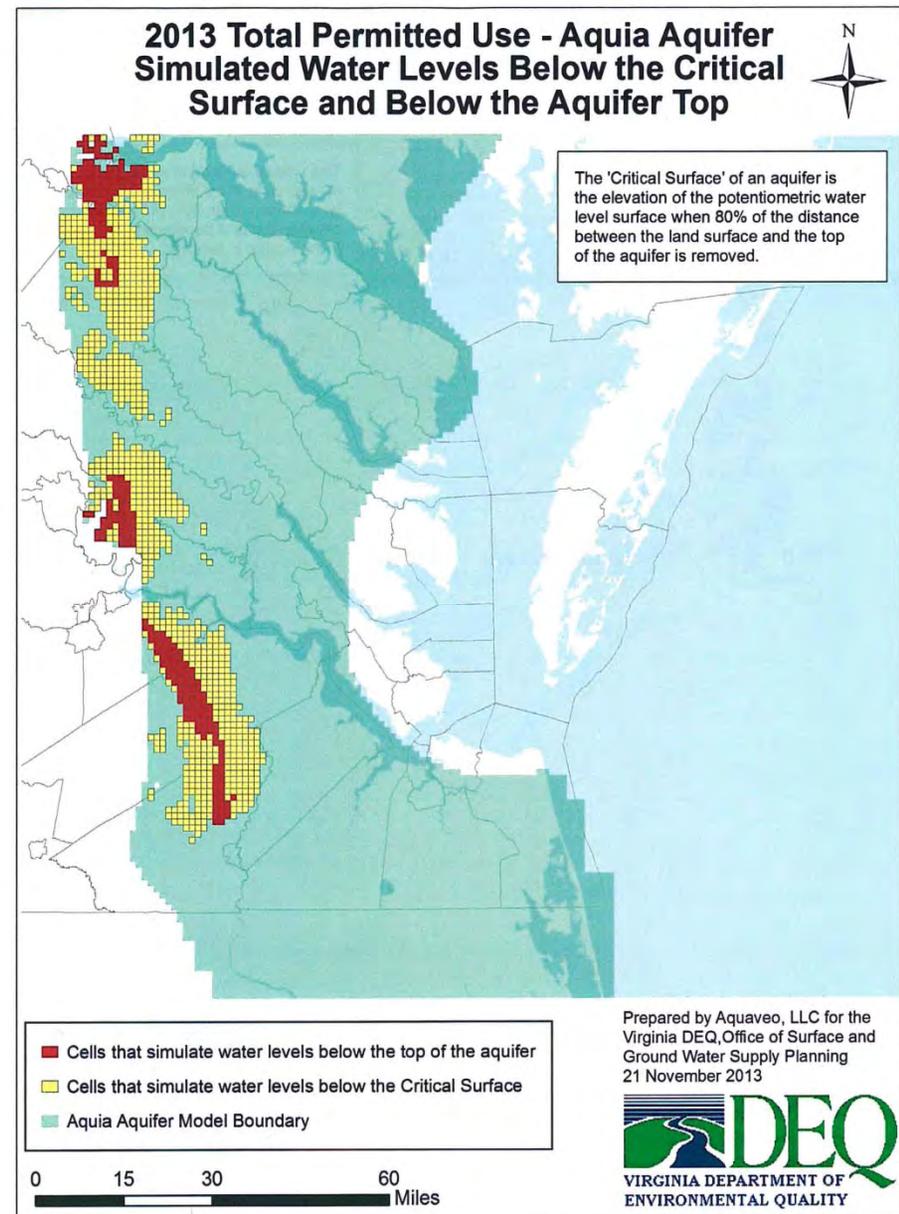
Wells are assigned Aquifer unit from the hydrogeologic framework [McFarland and Bruce (2006)] with screens that can and do intersect multiple aquifers



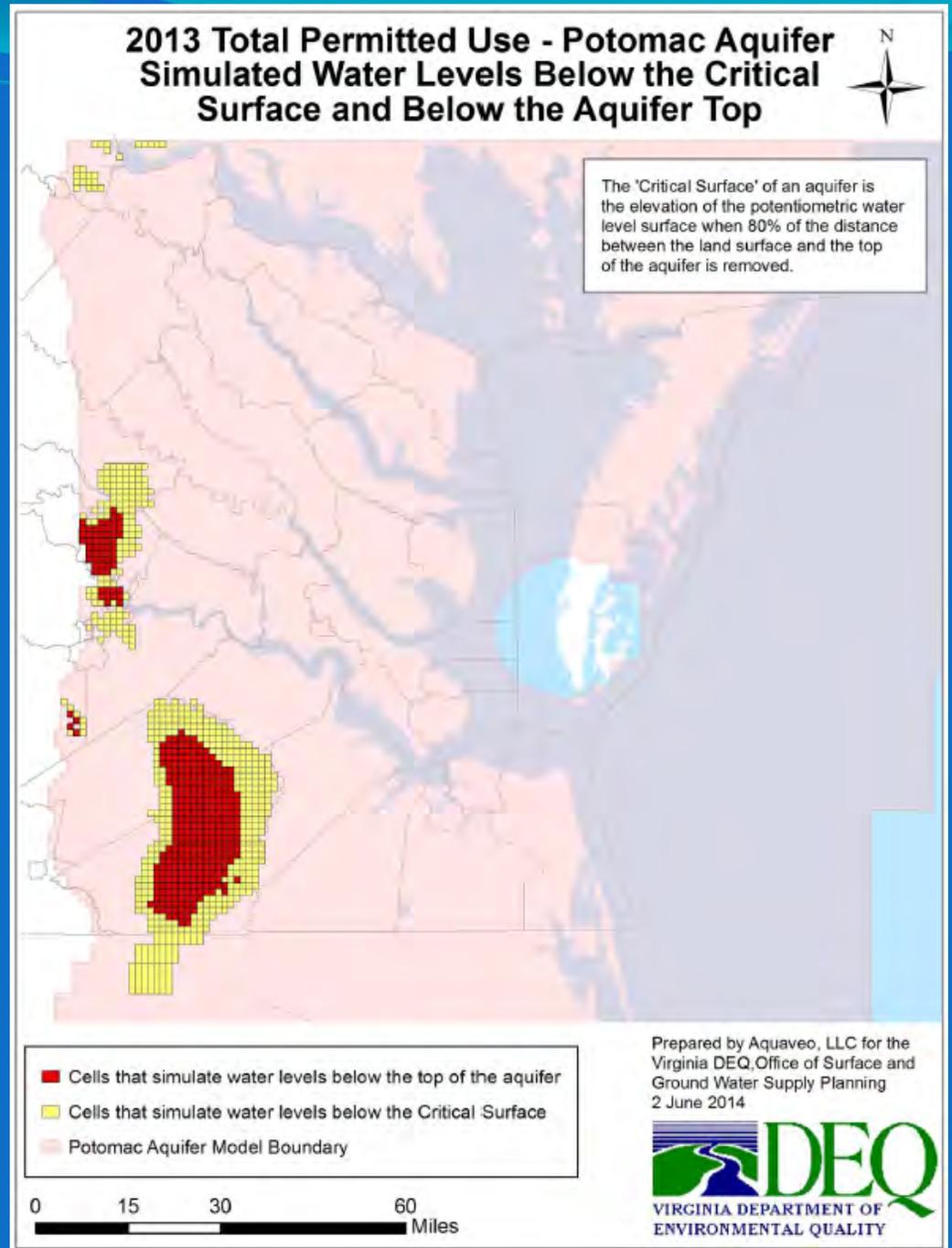
# 2013 Total Permitted: Piney Point



# 2013 Total Permitted: Aquia



# 2013 Total Permitted: Potomac



# Charles City County

Major water sources include groundwater wells and the James River.

Reported 2010 Groundwater Use (MGD)	Reported 2010 Surface Water Use (MGD)	Projected 2040 Groundwater Use (MGD)	Projected 2040 Surface Water Use (MGD)
1.27	0.37	2.54	1.58

Population and demand are projected to increase through the planning period. Demand is expected to exceed well capacity by 2040 in certain service areas. Additional groundwater sources are expected to meet demands in neighborhood service areas. Deficits in planned industrial areas (with no current source) may be met with interconnection to adjacent localities.

# Chesterfield County

Major water sources include the Lake Chesdin Reservoir, James River, Swift Creek Reservoir, and purchased water.

<b>Reported 2010 Groundwater Use (MGD)</b>	<b>Reported 2010 Surface Water Use (MGD)</b>	<b>Projected 2040 Groundwater Use (MGD)</b>	<b>Projected 2040 Surface Water Use (MGD)</b>
15.72	120.33	26.29	197.58

Population and demand are expected to increase through the planning period. A peak day deficit of 1.0 MGD is anticipated by 2040, and ARWA anticipates a system-wide deficit of 9.4 MGD by 2040. Potential alternatives: increases in water supply allocations, development of additional supplies (GW, new intake on Appomattox River, new surface water reservoir).

# Colonial Heights

Major water source is purchased water.

Reported 2010 Groundwater Use (MGD)	Reported 2010 Surface Water Use (MGD)	Projected 2040 Groundwater Use (MGD)	Projected 2040 Surface Water Use (MGD)
0.00	2.11	0.00	2.46

Population and demand are projected to increase through the planning period. A peak day deficit of 0.1 MGD is anticipated by 2020. ARWA anticipates a system-wide deficit of 9.4 MGD by 2040. Potential alternatives: increases in water supply allocations, development of additional supplies (GW, new intake on Appomattox River, new surface water reservoir).

# Dinwiddie County

Major water sources include agricultural ponds, Booth Run, purchased water, and groundwater wells.

<b>Reported 2010 Groundwater Use (MGD)</b>	<b>Reported 2010 Surface Water Use (MGD)</b>	<b>Projected 2040 Groundwater Use (MGD)</b>	<b>Projected 2040 Surface Water Use (MGD)</b>
1.38	3.27	2.02	6.04

Population and demand are projected to increase through the planning period. ARWA anticipates a system-wide deficit of 9.4 MGD by 2040. Potential alternatives: increases in water supply allocations, development of additional supplies (GW, new intake on Appomattox River, new surface water reservoir).

# Emporia

Major water source is the Emporia Reservoir.

Reported 2010 Groundwater Use (MGD)	Reported 2010 Surface Water Use (MGD)	Projected 2040 Groundwater Use (MGD)	Projected 2040 Surface Water Use (MGD)
0.00	1.01	0.00	1.00

Population is projected to increase through the planning period. Existing water supply may not be adequate to meet projected demands

# Greenville County

Major water sources are the Nottoway River, Fontaine Creek, groundwater wells, and purchased water.

<b>Reported 2010 Groundwater Use (MGD)</b>	<b>Reported 2010 Surface Water Use (MGD)</b>	<b>Projected 2040 Groundwater Use (MGD)</b>	<b>Projected 2040 Surface Water Use (MGD)</b>
0.59	3.90	0.78	3.92

Population and demand are projected to increase slightly through the planning period. To address concerns over the reliability of their source water (purchased water from Georgia Pacific), GCWSA submitted a VWP permit to improve their existing system through installation of a new raw water intake on the Nottoway River and construction of a pumped storage reservoir (JPA No. 13-0957).

# Hopewell

Major water source is the Appomattox River

<b>Reported 2010 Groundwater Use (MGD)</b>	<b>Reported 2010 Surface Water Use (MGD)</b>	<b>Projected 2040 Groundwater Use (MGD)</b>	<b>Projected 2040 Surface Water Use (MGD)</b>
0.00	22.10	0.00	24.69

Population is expected to increase during the planning period. Existing water sources are expected to meet projected demands.

# Petersburg

Major water sources are purchased water and groundwater wells.

<b>Reported 2010 Groundwater Use (MGD)</b>	<b>Reported 2010 Surface Water Use (MGD)</b>	<b>Projected 2040 Groundwater Use (MGD)</b>	<b>Projected 2040 Surface Water Use (MGD)</b>
0.04	4.83	0.04	5.73

Population is projected to increase slightly through the planning period. Existing water sources are expected to meet projected demands.

# Prince George County

Major sources include the James River, groundwater wells, and purchased water.

Reported 2010 Groundwater Use (MGD)	Reported 2010 Surface Water Use (MGD)	Projected 2040 Groundwater Use (MGD)	Projected 2040 Surface Water Use (MGD)
2.88	12.58	5.44	23.84

Population and demand are projected to increase through the planning period. A peak day deficit of 0.9 MGD is anticipated by 2020. ARWA anticipates a system-wide deficit of 9.4 MGD by 2040. Potential alternatives: increases in water supply allocations, development of additional supplies (GW, new intake on Appomattox River, new surface water reservoir).

# Surry County

Major water sources include groundwater wells and the James River.

Reported 2010 Groundwater Use (MGD)	Reported 2010 Surface Water Use (MGD)	Projected 2040 Groundwater Use (MGD)	Projected 2040 Surface Water Use (MGD)
0.75	17.84	1.05	17.89

Population and demand are projected to increase through the planning period. Existing water sources are expected to meet projected demand.

# Sussex County

Major water sources include groundwater wells and the Nottoway River.

<b>Reported 2010 Groundwater Use (MGD)</b>	<b>Reported 2010 Surface Water Use (MGD)</b>	<b>Projected 2040 Groundwater Use (MGD)</b>	<b>Projected 2040 Surface Water Use (MGD)</b>
2.67	0.04	3.14	0.04

Population and demand are projected to increase through the planning period. Existing water sources are expected to meet projected demands.

# 2015 General Assembly

- HB1871 Private Wells; Registration of Wells located in Groundwater Management Area
- HJ595/SJ272 Virginia's Water Resource Planning and Management; JLARC to study
- HB1924/SB1341 Eastern Virginia Groundwater Management Advisory Committee; established, report

## Next Steps

- DEQ will meet with localities, planning regions, and stakeholders to examine cumulative impact analysis
- DEQ will collaborate with localities and planning regions to develop a strategy to obtain additional data
- DEQ will provide analyses of data to localities so informed decisions can be made about water resources

# Questions?

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# CRATER PLANNING DISTRICT COMMISSION



- Contracting
- Business
- Information
- Development, Tourism
- Environment
- Data
- Meetings &

## VCU Metro View Development Tracker



Metro View is a VCU initiative to study, discuss, and analyze metropolitan areas with special focus on the Richmond region. Development Tracker is a VCU Metro View GIS database designed to monitor development trends and patterns in Central Virginia and the Crater Planning District. The project is being undertaken by the [VCU Center for Urban and Regional Analysis](#). This database is to be updated annually.

The [initial report was completed in May 2015](#). It includes all Crater PDC localities as well as Richmond Regional SMSA and PDC localities. It is approximately 200 MB in size.

Key data was collected for the base year 2013 from local assessor files and GIS systems including parcel land and improvement value and parcel size. Where available, existing land use, number of dwelling units per parcel, improvement construction year and building area were documented. The final report focused on single-family development. Future reports will add job type and location, Census socio-economic data, and an analysis of multi-family housing.

### Final Report 2015

<u><i>Crater PDC</i></u> 21 MB	<u><i>Charles City County</i></u> 7 MB	<u><i>Chesterfield County</i></u> 21 MB
<u><i>Colonial Heights</i></u> 5 MB	<u><i>Dinwiddie County</i></u> 7 MB	<u><i>Emporia</i></u> 4 MB
<u><i>Greensville County</i></u> 4 MB	<u><i>Hopewell</i></u> 4 MB	<u><i>Petersburg</i></u> 5 MB
<u><i>Prince George County</i></u> 6 MB	<u><i>Surry County</i></u> 1 MB	<u><i>Sussex County</i></u> 4 MB

# CRATER PLANNING REGION LOCAL ACTION PLAN SUMMARY

## WILDLIFE ACTION PLAN AND LOCAL SUMMARIES OVERVIEW

### *WILDLIFE ACTION PLAN*

Virginia is fortunate to contain a wide variety of natural resources and landscapes that provide Virginians with a range of benefits, services, and economic opportunities. Natural resource conservation in Virginia, as in most states, is implemented by government agencies, non-governmental organizations, private institutions, academic institutions, and private citizens. These groups work to enhance the quality of life within the Commonwealth by conserving Virginia's air, land, water, and wildlife. Adequate funding and human capital needed to manage and conserve these valuable resources are not always available; thus, Virginia's conservation partners must prioritize efforts to better maximize the benefits of their actions. In 2005, Virginia's conservation community created Virginia's first Wildlife Action Plan (Action Plan), which was written to prioritize and focus conservation efforts to prevent species from declining to the point where they become threatened or endangered (DGIF 2005). The Action Plan addresses eight specific elements mandated by Congress. They are:

- 1. Information on the distribution and abundance of species of wildlife, including low and declining populations as the State fish and wildlife agency deems appropriate, that are indicative of the diversity and health of the State's wildlife; and*
- 2. Descriptions of locations and relative condition of key habitats and community types essential to conservation of species identified in (1); and*
- 3. Descriptions of problems which may adversely affect species identified in (1) or their habitats, and priority research and survey efforts needed to identify factors which may assist in restoration and improved conservation of these species and habitats; and*
- 4. Descriptions of conservation actions determined to be necessary to conserve the identified species and habitats and priorities for implementing such actions; and*
- 5. Proposed plans for monitoring species identified in (1) and their habitats, for monitoring the effectiveness of the conservation actions proposed in (4), and for adapting these conservation actions to respond appropriately to new information or changing conditions; and*
- 6. Descriptions of procedures to review the Plan-Strategy at intervals not to exceed ten years; and*
- 7. Plans for coordinating, to the extent feasible, the development, implementation, review, and revision of the Plan-Strategy with Federal, State, and local agencies and Indian tribes that manage significant land and water areas within the State or administer programs that significantly affect the conservation of identified species and habitats.*

*8. Congress has affirmed through the Wildlife Conservation and Recreation Program (WCRP) and State Wildlife Grants (SWG), that broad public participation is an essential element of developing and implementing these Plans-Strategies, the projects that are carried out while these Plans-Strategies are developed, and the Species in Greatest Need of Conservation (SGCN) that Congress has indicated such programs and projects are intended to emphasize.*

Each species in the 2015 Action Plan (Species of Greatest Conservation Need or SGCN) is evaluated and prioritized based upon two criteria: degree of imperilment and management opportunity.

To describe imperilment, species are grouped into one of four Tiers: Critical (Tier I), Very High (Tier II), High (Tier III), and Moderate (Tier IV).

***Tier I - Critical conservation need.** Species face an extremely high risk of extinction or extirpation. Populations of these species are at critically low levels, face immediate threat(s), and/ or occur within an extremely limited range. Intense and immediate management action is needed.*

***Tier II - Very high conservation need.** Species have a high risk of extinction or extirpation. Populations of these species are at very low levels, face real threat(s), and/ or occur within a very limited distribution. Immediate management is needed for stabilization and recovery.*

***Tier III- High Conservation Need.** Extinction or extirpation is possible. Populations of these species are in decline, have declined to low levels, and/ or are restricted in range. Management action is needed to stabilize or increase populations.*

***Tier IV- Moderate Conservation Need.** The species may be rare in parts of its range, particularly on the periphery. Populations of these species have demonstrated a declining trend or a declining trend is suspected which, if continued, is likely to qualify this species for a higher tier in the foreseeable future. Long-term planning is necessary to stabilize or increase populations.*

While degree of imperilment is an important consideration, it is often insufficient to prioritize the use of limited human and financial resources. In order to identify and triage conservation opportunities, development of the updated Action Plan (2015) included assigning a Conservation Opportunity Ranking to each species identified within the Plan. The rankings were assigned with input from the taxa or species experts (biologists) and other members of Virginia's conservation community, and based on applicable conservation or management actions and research needs identified for the species within the 2005 Action Plan. In addition, a literature review was conducted to garner any new information available since the first version of the Action Plan. The three levels of conservation opportunity are described as follows:

*A – Managers have identified “on the ground” species or habitat management strategies expected to benefit the species; at least some of which can be implemented with existing*

resources and are expected to have a reasonable chance of improving the species' conservation status.

*B – Managers have only identified research needs for the species or Managers have only identified “on the ground” conservation actions that cannot be implemented due to lack of personnel, funding, or other circumstance.*

*C – Managers have failed to identify “on the ground” actions or research needs that could benefit this species or its habitat or all identified conservation opportunities for a species have been exhausted.*

Over 880 SGCN listed in the 2015 Action Plan are found in varying densities across the state (Figure 1). Of the Plan's SGCN, 16.8% are classified as Conservation Opportunity Ranking A; 6.7% are classified Conservation Opportunity Ranking B, and 76.5% are classified as Conservation Opportunity Ranking C.

- Approximately 25% of the SGCN are already listed as threatened or endangered under the Federal or Virginia Endangered Species Act,
- Approximately 60% are aquatic,
- Approximately 70% are invertebrates, and
- All are impacted by the loss or degradation of their habitats.

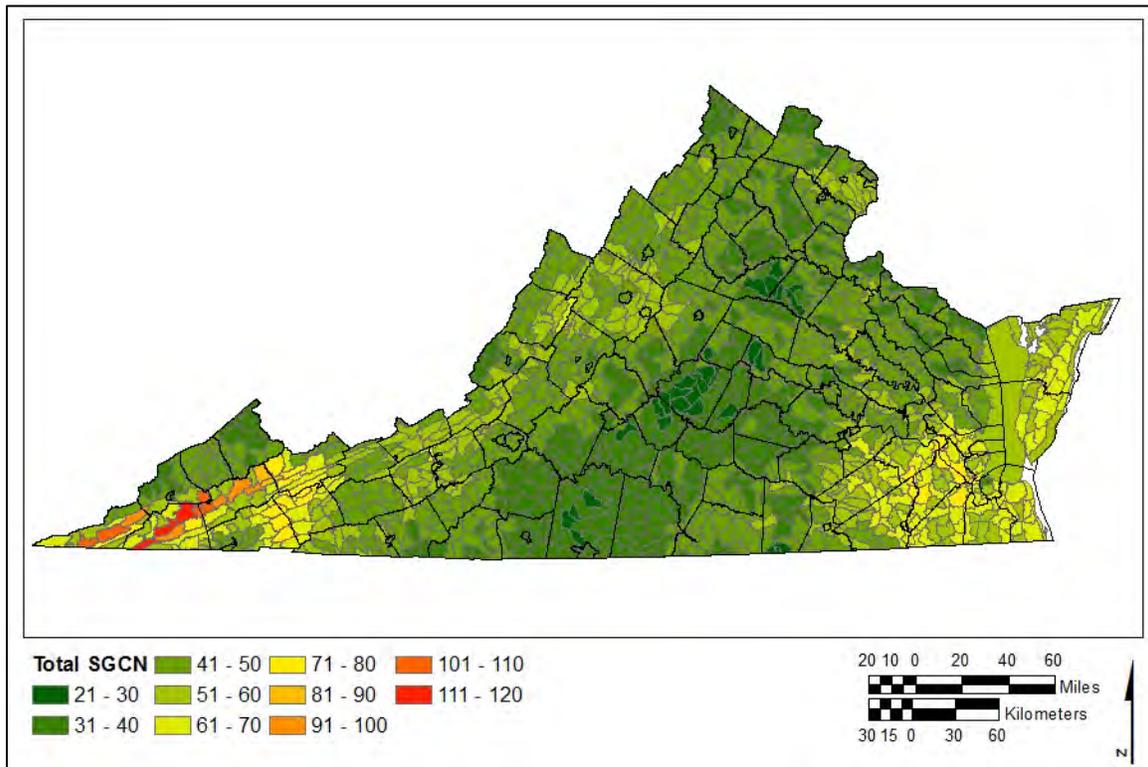


Figure 1. State distribution of Species of Greatest Conservation Need by HUC12 Watersheds.

## *WILDLIFE ACTION PLAN IMPLEMENTATION*

Since its creation, the Wildlife Action Plan has helped Virginia acquire over \$17 million in new conservation funding through the State Wildlife Grants Program. These resources have been used to implement significant research, advance species recovery efforts via captive propagation, and restore and conserve important wildlife habitats. Despite these successes, many conservation practitioners feel the original Wildlife Action Plan never reached its full potential. One common concern is that it failed to focus at the habitat level where the needs of many species could be addressed at once. Further, many partners indicated the original Action Plan did not provide sufficient details to help prioritize conservation needs and opportunities at a local scale, where many land use decisions are made and conservation efforts are implemented. Lacking these local insights, it was often difficult for agencies, municipalities, organizations, academic institutions, and landowners to identify and focus on the highest priority wildlife conservation opportunities for their geographic area. To address this concern and make the Action Plan more user-friendly and relevant at a finer scale, this version (2015) of the Action Plan was developed to include locally-based summaries. These summaries identify species that are local priorities, habitats required to conserve those species, local threats impacting species and habitats, and priority conservation actions that can be taken to address those threats. The goal of these summaries is to facilitate and benefit the work of local governments, conservation groups, landowners, and other members of the conservation community who wish to support wildlife conservation within their regions.

## *LOCAL ACTION PLAN SUMMARIES*

In creating the updated Action Plan, the Virginia Department of Game and Inland Fisheries (DGIF) adopted a model developed by the Virginia Department of Conservation and Recreation (DCR) for the Virginia Outdoors Plan. The Virginia Outdoors Plan describes recreational resource issues for 21 multi-county Recreational Planning Regions (DCR 2013). Each Recreational Planning Region is roughly analogous to one of Virginia's 21 local Planning District Commissions (PDC). The PDCs are voluntary associations of local governments intended to foster intergovernmental cooperation by bringing together local officials, agency staff, the public, and partners to discuss common needs and develop solutions to regional issues. With its focus on local-scale actions, the Virginia Outdoors Plan has become an important tool for identifying and addressing local recreational issues. With the revised Action Plan's focus on local planning regions, the DCR model has been adapted to address wildlife and habitat issues for the benefit of planning region residents. More broadly, the new Action Plan's Local Action Plan Summaries will create a framework that Virginia's diverse conservation community can use to identify issues and locations of mutual conservation interest, enhance collaborative opportunities, develop new conservation resources, and craft "win-win" situations that can be beneficial for both the people and wildlife of Virginia.

## CRATER LOCAL PLANNING REGION SUMMARY OVERVIEW

The Crater Planning Region consists of 1,653,478 acres (2,584 square miles) and includes the counties of Dinwiddie, Greensville, Prince George, Surry, and Sussex and cities of Colonial Heights, Emporia, Hopewell, and Petersburg. The human population in this planning region is estimated to be almost 174,000 people (U.S. Census Bureau 2015). These counties are projected to experience slight population growth by 2030 (Weldon Cooper Center 2012).

Less developed and more rural areas often provide a diversity of valuable wildlife habitats, which can be degraded or lost as human populations grow. This planning region is especially important to the conservation of red cockaded woodpecker found within pine savanna habitat. This savanna habitat is also important to Bachman's sparrow and southern chorus frog, among other species. The region's blackwater systems support a broad range of SGCN such as the black banded sunfish, dwarf waterdog, and topline minnow. Mature pine forest habitat supports the southeastern fox squirrel. The region also includes a variety of other habitat types such as mature mixed hardwood forests, young forests, retired agricultural land, tidal and non-tidal wetlands, and tidally influenced streams and riparian habitats (Figure 2).

In developing conservation actions for habitats and priority species within this planning region, a number of factors must be considered to determine how limited resources can be allocated to best effect. A project's likely impact and probability of success, the effectiveness of historic and ongoing conservation actions, as well as logistical, economic, and political factors will all influence the selection and prioritization of conservation actions. Virginia's Wildlife Action Plan advocates a proactive approach that focuses conservation resources to manage species before they become critically imperiled and to implement projects that can simultaneously benefit multiple species and human communities. These factors were considered during development of the conservation actions included in the following sections as well as in analyzing the existing threats facing SGCN and their habitats. Threats and conservation actions are organized based on the habitat types found within this planning region upon which priority SGCN depend.

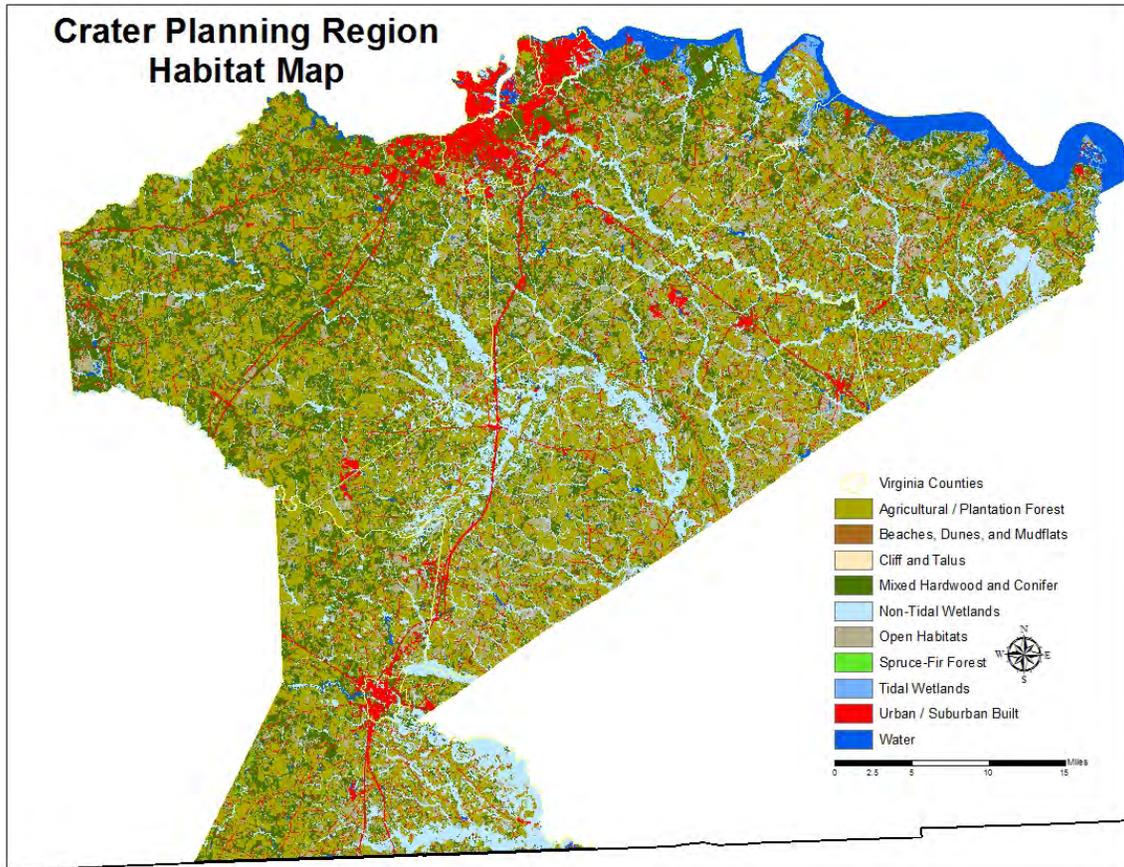


Figure 2. Crater Planning Region Habitats (Anderson et al. 2013; DGIF 2015).

### *PRIORITY SPECIES OF GREATEST CONSERVATION NEED*

Of Virginia’s 883 SGCN, 121 are believed to either occur, or have recently occurred, within the Crater Planning Region (Appendix A). Of these 121 species, 69 are considered to be incidental, meaning they either migrate through the region or the region is located at the fringe of their range (for more information on the process for determining which species are incidental, see Approach and Methods Section). **The remaining 52 SGCN are dependent upon habitats provided within the Crater Planning Region (Table 2). These species constitute the priority SGCN for the planning region.** A summary of SGCN Tier and Conservation Opportunity Rankings is provided in Table 1 while Figure 3 demonstrates the density of the 52 priority species within this region.

Priority SGCN within this Local Summary include species for which this planning region comprises a significant portion of its range in Virginia. As such, the authors implemented a 10 percent rule to identify locally important species. Under the 10 percent rule, an SGCN is included in a Local Summary if the planning region provides at least 10 percent of that species’ range in Virginia. However, there are several other instances that warrant inclusion on the priority SGCN list. First, several SGCN occur statewide but in low numbers in each planning

region and will never reach the 10 percent threshold in any single planning region. Species that fall in this category were manually added to priority SGCN lists where appropriate. Some species only occur in three or fewer planning regions. These SGCN are also included on priority lists due to their rarity in the state and the importance of those few planning regions to its survival. For migrant species that may only be in Virginia for a matter of days, these migratory habitats are considered critical for their long-term conservation. When these circumstances were identified, specific migratory species were manually added to local SGCN lists. Finally, where a species may have a particularly strong population in a relatively small portion of a planning region, the population may be determined to be significant enough to warrant inclusion on the local SGCN list. Again, when these circumstances were identified, species were manually added to the local priority SGCN list.

Table 1. Tier and Conservation Opportunity Ranking Distribution among Priority SGCN.

Number of SGCN	Tier and Conservation Opportunity Rank
7	Ia
1	Ib
3	IIa
1	IIb
4	IIC
1	IIIa
1	IIIb
6	IIIc
5	IVa
3	IVb
20	IVc

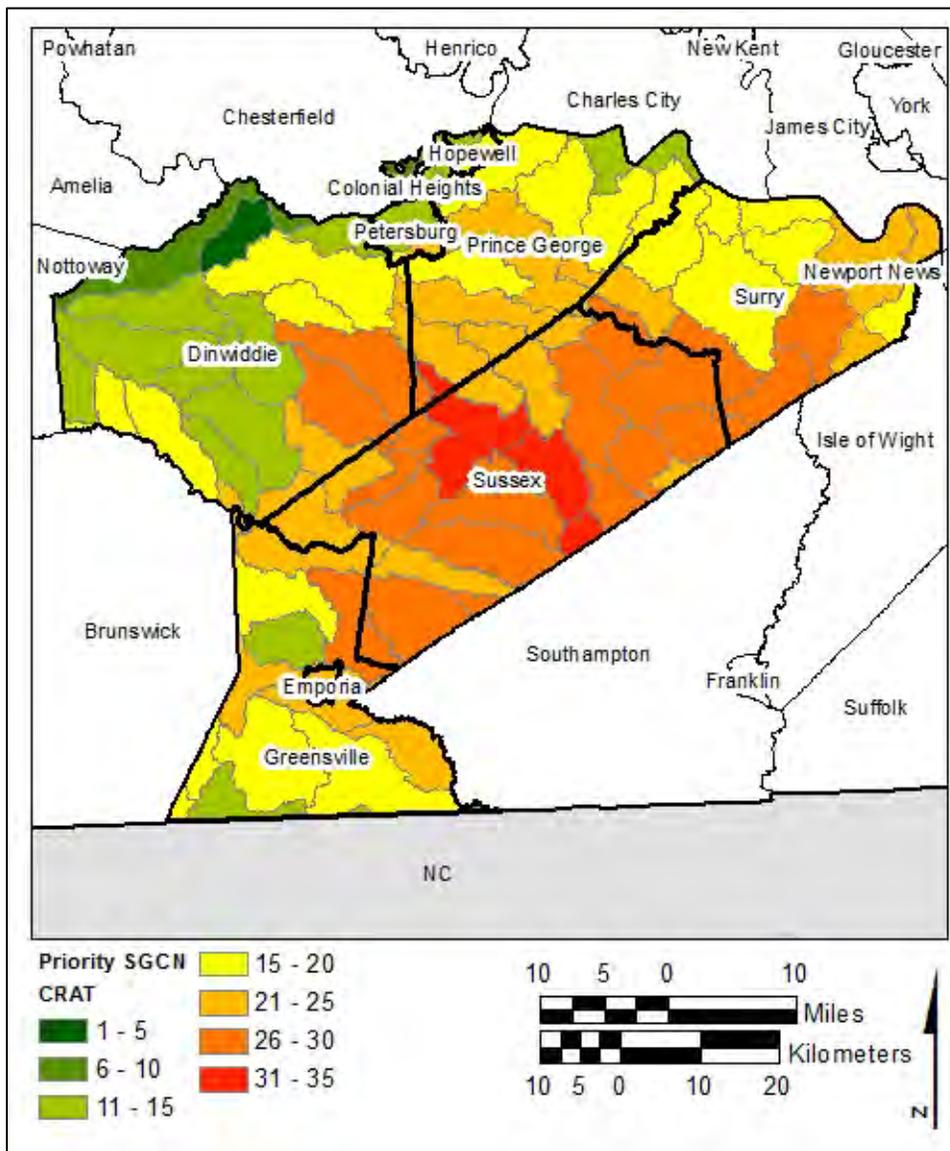


Figure 3. Priority SGCN Density in the Crater Planning Region (HUC12).

Table 2. Priority Species of Greatest Conservation Need Distribution within Crater Planning Region.

Conservation Status	Tier	Opportunity Ranking	Common Name	Scientific Name	% State Distribution	# Planning Regions	Habitat
<b>FESE</b>	I	a	Red-cockaded woodpecker	<i>Picoides borealis</i>	88.76	2	Pine savanna
	III	b	Southeastern fox squirrel	<i>Sciurus niger niger</i>	75.96	3	Open mature stands of pine or pine/hardwoods
<b>SE</b>	I	a	Blackbanded sunfish	<i>Enneacanthus chaetodon</i>	62.78	2	Acidic pools, creeks, and swamps with thick vegetation
	III	c	Dwarf waterdog	<i>Necturus punctatus</i>	59.11	4	Sluggish streams and blackwater streams with debris
	IV	c	Lined topminnow	<i>Fundulus lineolatus</i>	56.73	3	Moderately acidic margins of swamps and creeks with dense vegetation
<b>ST</b>	I	a	Bachman's sparrow	<i>Aimophila aestivalis</i>	56.59	2	Pine savanna/ open pine woodlands
<b>FS</b>	III	c	Chowanoke crayfish	<i>Orconectes virginiensis</i>	56.13	4	Sluggish streams and swamps with abundance of dead wood on the bottom
	IV	c	Ridged lioplax	<i>Lioplax subcarinata</i>	51.31	4	Clean water with slow currents and sandy substrates, most often found in rivers with stable shorelines and wide riparian forests.
IV	c	Many-lined salamander	<i>Stereochilus marginatus</i>	49.89	4	Gum and cypress swamps as well as other wooded wetlands	
IV	c	Southern chorus frog	<i>Pseudacris nigrita</i>	47.09	4	Grassy wet areas within or near pine forests	
II	c	Oak toad	<i>Anaxyrus quercicus</i>	46.02	3	Pine savanna	
IV	c	Lake chubsucker	<i>Erimyzon sucetta</i>	44.73	2	Clear to slightly stained warm water ponds, lakes, ditches, and streams	
IV	c	Banded sunfish	<i>Enneacanthus obesus</i>	40.66	3	Blackwater swamps, ponds, and streams with thick vegetation	
IV	c	Sharp sprite	<i>Promenetes exacuus</i>	39.26	3	No specific habitats have been identified for this aquatic snail but it occurs across most of North America	
IV	a	Carolina slabshell mussel	<i>Elliptio congaraea</i>	38.13	7	Small streams to rivers with swift flow and sandy substrates	
III	c	Ironcolor shiner	<i>Notropis chalybaeus</i>	34.42	6	Moderately acidic creeks, streams, and swamps	
<b>ST</b>	II	c	Mabee's salamander	<i>Ambystoma mabeei</i>	32.51	4	Pine and hardwood forests with vernal ponds and other water sources suitable for breeding
	IV	c	Mudsnake	<i>Farancia abacura abacura</i>	31.65	5	Wetland generalist as long as aquatic salamanders are present
IV	c	Marsh rabbit	<i>Sylvilagus palustris palustris</i>	31.23	4	Freshwater wetlands	
IV	b	Southeastern myotis	<i>Myotis austroriparius</i>	28.15	2	Riparian forests with suitable roost structures	
<b>FESE</b>	I	a	Dwarf wedgemussel	<i>Alasmidonta heterodon</i>	27.83	8	Clean warm streams and rivers with low to

							moderate current and unsilted substrates
IV	c	Gravel elimia	<i>Elimia catenaria</i>	27.41	11		Streams and rivers with high ground water content and good flow
IV	c	Mud sunfish	<i>Acantharchus pomotis</i>	27.34	9		Swamps, ponds, and slow moving water
IV	c	Little grass frog	<i>Pseudacris ocularis</i>	27.27	3		Most abundant in wetlands within pine savannah habitats
IV	c	Cotton mouse	<i>Peromyscus gossypinus gossypinus</i>	26.39	3		Riparian forests
IV	c	Rainbow snake	<i>Farancia erythrogramma erythrogramma</i>	25.81	6		Riparian forest - eel obligate
IV	c	Yellow-bellied slider	<i>Trachemys scripta scripta</i>	23.38	6		A variety of freshwater habitats including rivers, ponds, lakes, and roadside ditches
IV	a	Alewife floater	<i>Anodonta implicata</i>	20.94	6		Alewife obligate - coastal streams and lakes with sand or gravel substrates
IV	c	Greater siren	<i>Siren lacertina</i>	20.84	6		Tolerates a variety of warm aquatic habitats with abundant vegetation
<b>FS</b>	II	b	Roanoke slabshell	<i>Elliptio roanokensis</i>	19.28	5	Deeper channels of relatively fast flowing rivers
<b>FS</b>	II	c	Rare skipper	<i>Problema bulenta</i>	18.87	4	Freshwater and brackish marsh
	I	a	Roanoke bass	<i>Ambloplites cavifrons</i>	18.36	8	Warm large creeks, streams, and small rivers with low gradient and typically clear water.\
	III	c	Lesser siren	<i>Siren intermedia intermedia</i>	17.81	5	Tolerates a variety of warm aquatic habitats with abundant vegetation
<b>FESE</b>	II	a	Roanoke logperch	<i>Percina rex</i>	17.41	8	Warm clear stream and rivers with low to moderate gradient and unsilted substrate
	III	a	Black-crowned night-heron	<i>Nycticorax nycticorax hoactii</i>	15.44	7	Variety of marshes, swamps, and wooded streams
	I	b	Atlantic sturgeon	<i>Acipenser oxyrinchus</i>	15.29	5	Migratory and utilize variety of aquatic and marine habitats
	II	a	Yellow lampmussel	<i>Lampsilis cariosa</i>	14.26	12	Large streams and rivers with low gradient and sand and gravel substrates
	IV	c	American brook lamprey	<i>Lampetra appendix</i>	14.22	16	Requires clear flowing water but can tolerate a range of temperatures and substrates
	IV	c	Scarletsnake	<i>Cemophora coccinea copei</i>	14.13	13	Forest generalist but require soils suitable for digging
	IV	b	Northern lance mussel	<i>Elliptio fisheriana</i>	13.36	14	Shallow water near stable banks with intact riparian zones and soft substrates
	IV	a	Alewife	<i>Alosa pseudoharengus</i>	13.36	10	Migratory
	IV	a	American shad	<i>Alosa sapidissima</i>	13.14	11	Large unfragmented migratory rivers for spawning
<b>CC</b>	III	c	Spotted turtle	<i>Clemmys guttata</i>	12.57	14	Freshwater swamps and marshes

<b>FSST</b>	I	a	Atlantic pigtoe	<i>Fusconaia masoni</i>	11.67	9	Clean swift waters with stable gravel or sand/ gravel substrate
	IV	c	Eastern slender glass lizard	<i>Ophisaurus attenuatus longicaudus</i>	11.64	9	Upland pine habitats
	IV	a	Eastern pondmussel	<i>Ligumia nasuta</i>	11.02	6	Areas of limited currents and significant amounts of fine organic matter. Can tolerate a wide range of substrates
	IV	b	Clapper rail	<i>Rallus longirostris crepitans</i>	10.27	8	Saltmarshes
	IV	c	Eastern spadefoot	<i>Scaphiopus holbrookii</i>	10.18	18	Forest and upland habitat generalist but require soils suitable for digging
<b>ST</b>	II	c	Whitemouth shiner	<i>Notropis alborus</i>	8.63	3	Clear to somewhat turbid creeks, with varying substrates
<b>SE</b>	I	a	Rafinesque's eastern big- eared bat	<i>Corynorhinus rafinesquii macrotis</i>	5.37	3	Use hollow trees as well as various types of human structures for roosting
<b>SE</b>	II	a	Canebrake rattlesnake	<i>Crotalus horridus (canebrake)</i>	<0.01	3	Barren
	III	c	Glossy crayfish snake	<i>Regina rigida rigida</i>	<0.01	3	Freshwater wetland generalist

\*\* Federal Endangered (FE), State Endangered (SE), Federal Threatened (FT), State Threatened (ST), Federal Species of Concern (FS), Federal Candidate (FC), Federal Species of Concern (FS), and Species of Collection Concern (CC).

## CONSERVED LANDS IN THE CRATER PLANNING REGION

Recognizing the importance of the local habitats to resident and migratory wildlife, state, federal, and private entities have made significant investments to conserve lands within this planning region. The conservation mechanisms range from conservation easements to state parks to state wildlife management areas, and National Wildlife Refuges (NWR).

Significant conservation assets, in terms of size, include:

- James River National Wildlife Refuge,
- Chickahominy Wildlife Management Area,
- Hog Island Wildlife Management Area
- Big Woods Wildlife Management Area,
- Piney Grove Preserve
- Crawford State Forest, and

These properties contain a diversity of open water, forest, agricultural, and wetland habitats (Figure 4). They have been conserved to provide a range of conservation, recreational, and economic benefits such as habitat protection and restoration, ecotourism, and fishing and hunting opportunities.

In addition to supporting mission functions, lands on the Fort Pickett Military Reservation and the Fort Lee Military Reservation also support a diversity of wildlife and habitats.

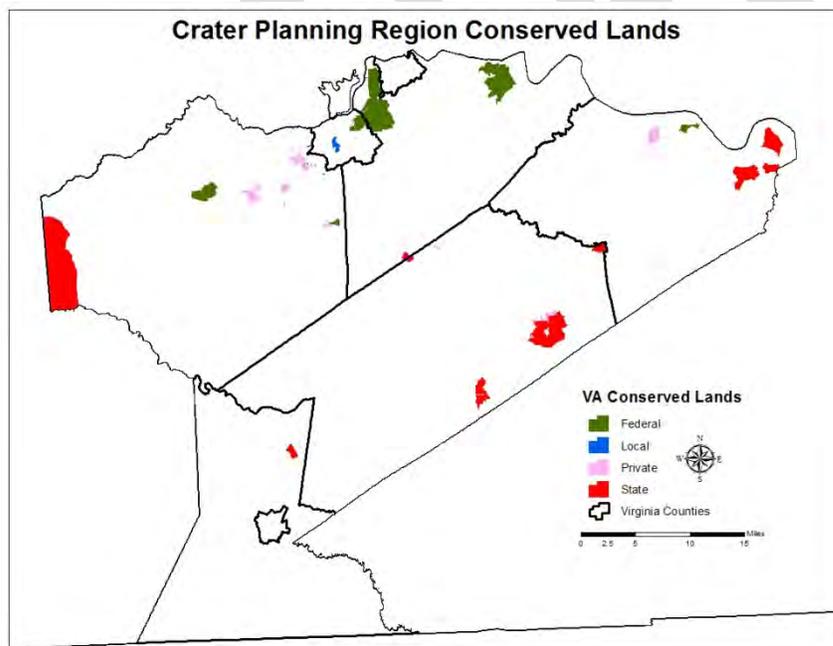


Figure 4. Conservation Lands in the Crater Planning Region (DCR 2014; DGIF 2015).

These properties serve as an important component of wildlife conservation efforts on within Crater Planning Region. Healthy and important habitats have been conserved within their boundaries;

however, working to conserve other lands could be beneficial for many SGCN and habitats within the region. Although there may be concern over the economic and social impacts of putting lands into conservation, many of these areas provide recreation and ecotourism benefits (DCR 2013; Carver and Caudill 2013). Through these mechanisms local economies could be bolstered; however, insufficient data exist to fully describe the benefits and drawbacks of lands held in conservation. To balance these interests, especially as conditions change, it will be critical for the conservation community to actively engage with local governments and stakeholders to ensure that conservation spending is beneficial for both wildlife and localities.

## CLIMATE CHANGE IMPACTS IN CRATER PLANNING REGION

Although Crater Planning Region is further inland than other coastal planning regions, climate change and resulting sea-level rise and storm-related events may affect areas within the region. The Virginia Institute of Marine Science (VIMS) (2013) used climate scenarios from the Intergovernmental Panel on Climate Change to determine a range of sea-level rise projections for Virginia. Based on this analysis and work with stakeholders, VIMS (2013) recommends using 1.5 feet of rise over the next 20 to 50 years for planning purposes. It also notes tropical storm events are expected to become more intense. Sea-level rise and more intense storm events are expected to increase shoreline erosion, facilitate salt water intrusion, destroy habitats and ecological systems, and increase stormwater overflows and sewage contamination (VIMS 2013). Based on climate projections, approximately 30 miles of coastline within this planning region will be vulnerable to sea-level rise (shoreline in Charles City, Chesterfield, Prince George, and Surry) (VIMS, 2013; Titus, 2010).

Increases and changes in temperature and precipitation will also negatively affect habitats and SGCN in the Crater Planning Region. Based on scientific reports and research, it is clear that temperatures in the state will get warmer. The models developed for Virginia's 2008 Climate Action Plan project that average temperatures will increase by 3.1°C (5.6°F) by the end of the century in Virginia (Governor's Commission on Climate Change 2008). Pyke et al. (2008), as a part of the Chesapeake Bay Program Science and Technical Advisory Committee, project that temperatures in the Chesapeake Bay region (Virginia and Maryland) may increase by as much as 11°F by 2100.

Increased temperatures may lead to heat stress for species, decreased water quality and dissolved oxygen content as well as changes to food availability (Boicourt and Johnson, 2011; Kane, 2013). Temperature increases may also be problematic for species at the edge of their ranges. For example, if species are at the more southern end of their range, they may not survive significant increases in temperature that are greater than they can withstand (Pyke et al., 2008). Warmer temperatures may also result in warmer waters, which could favor parasites and other pests in aquatic environments (Pyke, et al. 2008; Najjar et al. 2010; Kane 2013). Additionally, if temperatures and precipitation change such that season length is altered, fish and other species' reproductive cycles may be affected.

## CONSERVATION THREATS AND ACTIONS FOR WILDLIFE AND HABITATS IN CRATER PLANNING REGION

The following sections on threats, conservation actions, and conservation priorities are subdivided based on habitat type. Key habitat conservation strategies, actions, threats, and other impacts are summarized in Table 3. In many cases, actions taken to protect or enhance habitat will positively affect many Crater Planning Region priority SGCN and other species. Many of these activities are also expected to benefit landowners and communities.

Table 3. Summary of Conservation Strategies and Actions for Crater Planning Region.

Conservation Strategies	Conservation Actions	Threats Addressed	Economic/ Human Benefits	Priority Areas
<b>Maintain and restore wetland habitats</b>	1) Work with appropriate entities on wetlands permitting process to ensure adequate mitigation and restoration procedures are in place; 2) Implement living shorelines where feasible; 3) Establish or enhance vegetative buffer areas inland of existing wetlands; 4) Utilize relevant data (e.g., Virginia Department of Conservation and Recreation's wetlands catalog) to identify priority areas for conservation and restoration; and 5) Control invasive species.	Water quality degradation, habitat/ land use conversion, climate change, invasive species	Flood control; filtration services; erosion and sediment control; supports recreational and commercial fisheries; ecotourism/ wildlife watching and fishing/ hunting opportunities	Watershed with priority wetlands and areas adjacent to priority watershed that allow inland migration of wetlands
<b>Enhance, maintain and restore aquatic and shoreline habitats</b>	1) Work with landowners to implement small acreage grazing systems; 2) Repair/ replace failing septic systems; 3) Establish riparian vegetative buffers along waterways; 4) Establish waste storage facilities to better manage animal waste and prevent flow into rivers; 5) Establish retention ponds or features to manage and slow storm water runoff; 6) Work to prevent pet waste from entering waterways; 7) Restore aquatic connections; 8) Monitor and address invasive species impacts; and 9) Adopt land use practices or policies through zoning or other means to help improve the health of aquatic systems.	Water quality degradation, land use changes, water withdrawals, climate change, invasive species	Address TMDL concerns by reducing amounts of sediment, nutrients, pesticides, and other pollutants that enter water ways; Sustain sport fisheries and recreation opportunities	Beaver Pond Creek, Cypress Swamp, Little Nottoway River, Mill Swamp, Raccoon Creek, Rattlesnake Swamp, Three Creek, and Upper Nottoway River
<b>Maintain and restore forest habitat</b>	1) Protect land through acquisition, easement, incentives, or other mechanisms; 2) Implement vegetative buffers around extractive practices and development; 3) Work with state and federal agencies to ensure implementation of appropriate best management practices; 4) Maintain forest health to help ensure forest viability; and 5) Monitor and control invasive species.	Land use change and conversion, invasive species, climate change, threats to maritime forests	Flood control; water quality; and ecotourism/ wildlife viewing/other outdoor recreation	Forest patches adjacent to already protected parcels
<b>Maintain and restore open habitats</b>	1) Restore native grasses, shrubs, and forbs; 2) Maintain existing open habitats with periodic disturbance (e.g., burning, mowing, disking, etc.); and 3) Conserve, via acquisition, easement, collaboration, or agreement, patches from 20 acres to 100 or more acres.	Land use changes, invasive species	Conservation of native pollinators; erosion control; sequestration of nutrients, pesticides, and other pollutants before they enter rivers or karst systems	Pine savannas not already protected

## MAINTAIN AND RESTORE WETLAND HABITATS

Tidal and non-tidal wetlands are found throughout the Crater Planning Region. In addition to providing habitat for a diversity of aquatic and terrestrial species, wetlands help maintain water quality and quantity within a watershed, limit erosion caused by floods, and provide recreational opportunities for hunters, anglers, and wildlife watchers. Non-tidal marshes are the most common wetland type in this area (Table 4). These wetlands provide valuable habitats for the marsh rabbit, black crowned night herons, yellow rails, and a variety of other species.

Table 4. Wetland Acreage in Crater Planning Region (Anderson et al. 2013; DGIF 2015).

Wetland Type	Total Acres	Percent of Planning Region
Non-Tidal Wetlands	170, 189.50	13.70%
Tidal Wetlands	7,418.56	0.60%

### Threats

The health and quality of tidal and non-tidal wetlands are impacted by a variety of issues, both natural and anthropogenic. As the quality of a wetland degrades, so does the value of that wetland to Virginia's wildlife.

1. **Water Quality:** Wetlands help filter nutrients and other pollutants from watersheds, but they are also sensitive to activities that impair water quality and overload the system (Hemond and Benoit 1986). When best management practices are not implemented upstream, runoff laden with nutrients, sediment, and other pollutants enter the system in concentrations that hinder the wetland's filtering capacity. Storm water runoff from urban and developed areas also contributes to water quality issues that degrade wetlands (Hemond and Benoit 1986). Nutrient pollution and sedimentation are important issues for tidal and non-tidal wetlands throughout the planning region.
2. **Land Use Changes:** One of the most significant threats to tidal and non-tidal wetlands is conversion to other uses and hardening of shorelines that can harm wetland integrity and function. As more areas are developed for additional human uses, wetland areas will likely be lost.
3. **Invasive Species:** Invasive species often degrade quality of tidal wetland habitat through damage or loss to wetland vegetation. Mute swans out-compete native species by consuming significant amounts of emergent and submerged aquatic vegetation (DGIF 2012). Mute swans can also destroy vegetation by uprooting it, thereby limiting the effectiveness of wetland restoration (DGIF 2012). Invasive plant species such as *Phragmites* can overtake wetlands, changing vegetative composition to a monoculture and diminishing wetland function and value. Examples of invasive species affecting non-tidal wetlands include: privet, *Phragmites*, purple loosestrife, Japanese stilt grass, and exotic invertebrates.
4. **Climate Change:** As sea levels rise, marshes can be inundated and convert to shallow open water habitats or non-tidal and brackish wetlands may convert to higher salinity marshes. Shallow open water habitats and salt marshes likely will not support the same vegetative composition as the non-tidal and tidal wetlands in this planning region, affecting the wildlife species that depended on these

habitats. Additionally, as storms become more intense, more frequent inundation may also pose problems for vegetation and fish and wildlife species with low salinity tolerances.

## **Conservation Management Actions**

A number of actions can be taken to address threats affecting wetlands in the Crater Planning Region. To address development and fill impacts, the federal government and the Commonwealth of Virginia has established an extensive wetlands permitting process to help landowners and developers avoid impacts to wetlands while pursuing their management objectives. The Virginia Tidal Wetlands Act gives authority to the Virginia Marine Resource Commission (VMRC) to issue tidal wetland permits with the option to for local governments to assume this responsibility (DEQ 2011). The U.S. Army Corps of Engineers has authority to issue permits for impacts to non-tidal wetlands through the federal Clean Water Act, while DEQ has authority under Virginia's State Water Control Law. Permits are issued through a Joint Permit Application Process that can be initiated with DEQ (DEQ 2011). Mitigation to compensate for wetland loss is often required under these permits. However, wetlands restoration to reestablish or rebuild former wetland areas or restore functions to a degraded wetland also are voluntary conservation actions agencies and conservation partners can implement outside of required wetlands mitigation and are an important component to protecting wetlands (DEQ 2011). These types of conservation actions also help provide migration corridors for migratory birds that depend on wetlands for nesting, roosting, and foraging.

In certain situations, living shorelines can be a viable alternative to hardened or armored shorelines. By using native vegetation, oyster reefs, dune restoration, rock sills, bank grading, or other more natural methods living shorelines can help protect private property from erosion while also providing opportunities for wetlands to migrate as conditions change (Kane 2011) (VIMS 2010). Establishing or protecting vegetative buffers upland of wetlands is important to protect health of the existing wetlands as well as to provide a potential migration route as conditions change (Kane 2011). Approximately five percent of the wetlands in the planning region are protected; thus, the protection of additional wetland areas through acquisition, easement, or agreement would allow for further conservation of this important habitat and associated SGCN. Finally, working to limit invasive plants and animals and predators that might degrade the quality of these habitats will be important conservation actions.

Priority areas for wetlands protection and restoration within the Crater Planning Region include those wetlands that are inland of tidal wetlands that may provide some opportunity for inland migration as sea levels rise. These more inland areas also allow for large wetland complexes to be protected, ensuring larger habitat patches remain available for wildlife. Areas identified by conservation partners, such as the Virginia Department of Conservation and Recreation, as outstanding opportunities for conservation should also be considered priorities for protection and conservation. An initial review of the Virginia Wetlands Catalog identifies priority wetlands for conservation and restoration (Weber and Bulluck 2014). Designation of these areas was based on several factors, including existing plant and animal diversity, presence of significant natural communities, presence of natural lands providing ecosystem services, presence of corridors and stream buffers, proximity to conserved lands, inclusion within or downstream of healthy watersheds, and location of drinking water sources (Figure 5) (Weber and Bulluck 2014). DCR also designates potential restoration sites, identified based on similar factors as conservation areas, but also including consideration of inclusion within degraded watersheds, proximity to impaired waters, location of existing wetland mitigation banks, presence of prior converted and farmed wetlands, and inclusion of stream reaches with lower aquatic biodiversity (Figure 7) (Weber and

Bulluck 2014). The wetlands catalog indicates healthy wetlands occur throughout the planning region. Wetlands adjacent to conserved lands have a higher priority. Likewise, wetland restoration opportunities also occur throughout the region. Restoration efforts should focus on wetlands adjacent to either conserved lands or adjacent or upstream from healthy wetlands. Restoration priority areas are extensive in Surry and Dinwiddie counties and in some cases are adjacent to already protected lands. The Wetlands Catalog will be used by the Natural Resources Conservation Service as a tool to direct and prioritize spending for the Wetlands Reserve Enhancement Program and the Environmental Quality Incentives Program.

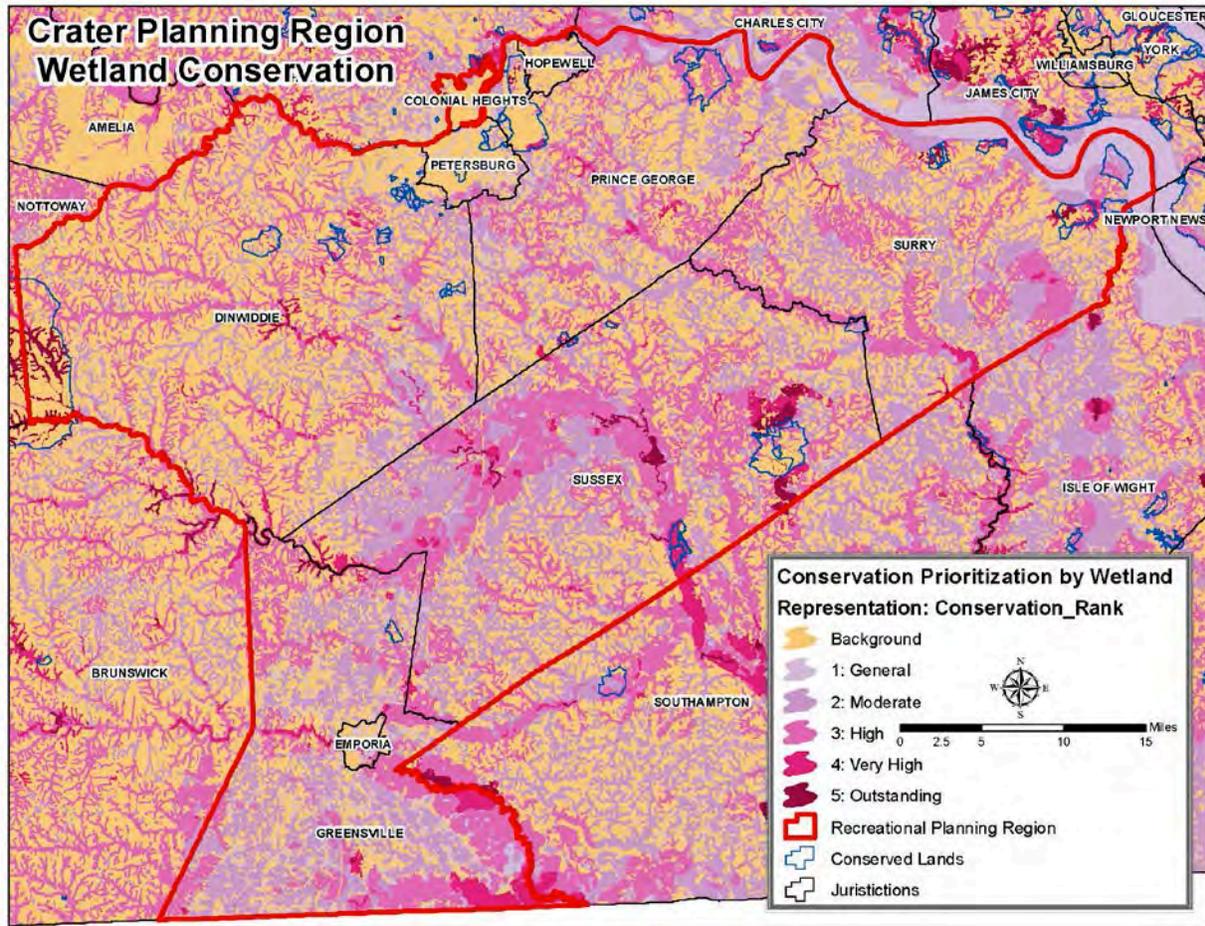


Figure 5. Wetland Conservation Priority Areas in Crater Planning Region (Weber and Bulluck 2014).

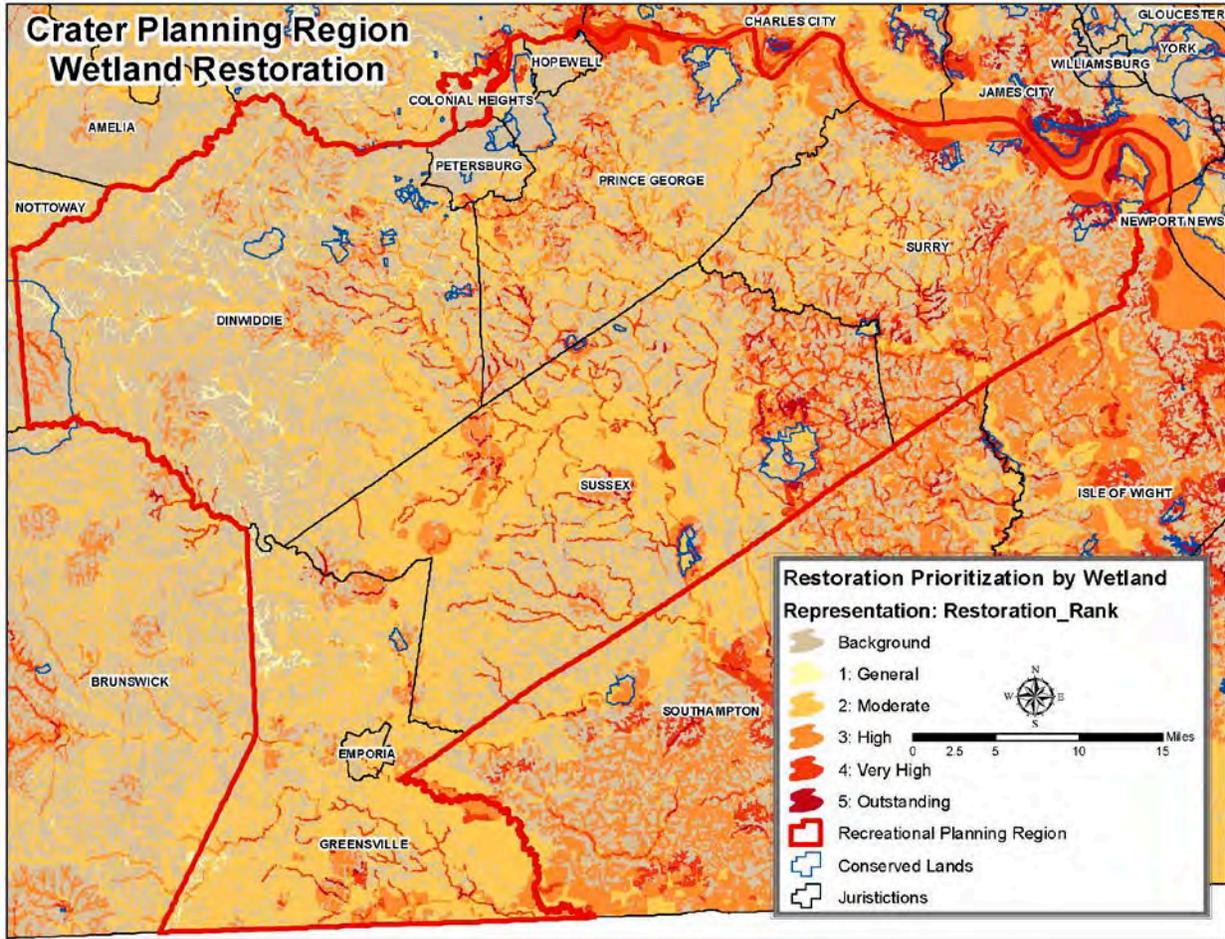


Figure 6. Wetland Restoration Priority Areas in Crater Planning Region (Weber and Bulluck 2014).

### *Climate-Smart Management Actions*

Additional wetlands climate-related conservation actions include: restoring and enhancing vegetation within the wetlands to support changing conditions (e.g., using vegetation species that can withstand a broader array of conditions like more frequent inundation and higher salinity levels), restoration of wetlands to increase their elevation along the coast where feasible or needed, and enhancement of wetland migration by targeted restoration or acquisition in areas where wetlands may migrate (both inland and upstream).

## *ENHANCE, MAINTAIN, AND RESTORE AQUATIC AND RIPARIAN HABITATS*

Aquatic systems in the Crater Planning Region include tidal and non-tidal freshwater creeks and streams. These systems provide important habitat for numerous species of wildlife, fish, and invertebrates. The Crater Planning Region also contains some of the best examples of Virginia's remaining blackwater habitats. Blackwater streams occur south of the James River, and they consist of sandy soils with tannin stained waters and little suspended clay sediment. They often are associated with bald cypress and tupelo as well as other bottomland hardwoods, but they also may have small, shrubby sloughs and shrub and herb layers (Anderson et al. 2013). Approximately 40,850 acres (3.3 percent) of the planning region is considered aquatic (Anderson et al. 2013; DGIF 2015). Priority SGCN that depend on these aquatic systems within this planning region include the blackbanded sunfish, Chowanoke crayfish, topline minnow, dwarf wedge mussel, and ridged lioplax snail.

### **Threats**

Aquatic and riparian habitats within the Crater Planning Region face multiple threats from water quality related issues to invasive species.

1. Water Quality Degradation: Pollution is the most significant threat to aquatic species and riparian habitats within the Crater Planning Region. Polluting materials include fertilizers, eroded sediment, and human and animal waste flowing into the region's creeks and rivers from storm water runoff, failing septic systems, and agricultural practices that do not conform to standard best management practices (DEQ 2014). In many cases, watersheds have insufficient riparian buffers and vegetative areas to stop these materials from flowing into the creek or stream (ACJV 2005). Once present in aquatic systems, these materials may concentrate in sediment and bottom-dwelling organisms where they can result in reduced levels of dissolved oxygen and altered pH levels (Chesapeake Bay Foundation 2014). In addition to the impacts on aquatic life, many of these substances pose a risk to human health and local economies (Chesapeake Bay Foundation 2014).
2. Impervious Surface: Impervious surfaces (i.e., land covers that do not permit water to permeate the ground) give a useful measure of the environmental condition of an area. In a developed watershed, a greater amount of surface water, often laden with pollutants, arrives into a stream at a faster rate than in less developed watersheds, increasing the likelihood of more frequent and severe flooding. Significant amounts of impervious surface area can also lead to degradation of water quality, changes in hydrology, habitat structure, and aquatic biodiversity. Much of the Crater Planning Region has a low percentage of impervious surface cover however; the larger population center has a higher percentage of impervious surfaces (Figure 7).

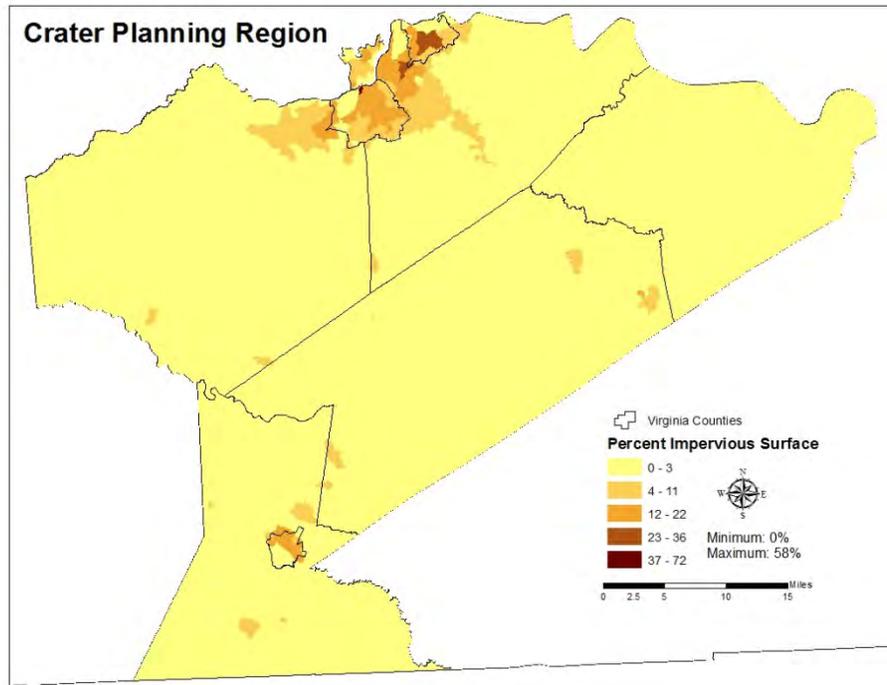


Figure 7. Impervious Surface Cover in Crater Planning Region (SARP 2014).

3. **Invasive Species**: Additional threats to aquatic systems within Crater Planning Region include invasive species such as blue catfish, mute swans, Asian carp (e.g., big head carp and grass carp) that either consume native species or consume aquatic vegetation, thereby altering the quality of these aquatic habitats.
4. **Land Conversion and Alteration**: Fragmentation from roads, culverts, and dams; channelization and shoreline alteration; and extractive land use practices can alter aquatic habitats in terms of changes to hydrology, chemistry, and water temperature. These practices may also directly alter habitats through loss of vegetative riparian cover, filling of streams, or hardening of stream banks.
5. **Water Withdrawals**: Water withdrawals for human and land uses can also alter stream hydrology and cause stress to aquatic species that depend on specific water levels and flow rates. Additionally, over-use of groundwater could lead to saltwater intrusion into the aquifer that could degrade the quality of both subterranean and surface water.
6. **Climate change**: Climate change will also affect aquatic systems in this planning region. Sea-level rise could result in inundation of shoreline, while changes in temperature and precipitation regimes could result in drier more drought prone summers. Water temperatures may also be affected, resulting in potential harm to fish and other aquatic species.

## Conservation Management Actions

The Virginia Department of Environmental Quality (DEQ), working with various partners and stakeholders, has developed Water Quality Improvement Plans for Beaverpond Creek (MapTech and New River-Highlands 2005), Cypress Swamp (MapTech and New River-Highlands 2005), Little Nottoway River (MapTech and New River-Highlands 2005), Mill Swamp (Working Group 2013), Raccoon Creek (MapTech and New River-Highlands 2005), Rattlesnake Swamp (MapTech and New River-Highlands 2005), Three Creek (Working Group 2013), and Upper Nottoway River (MapTech and New River-Highlands 2005) (Figure 8).

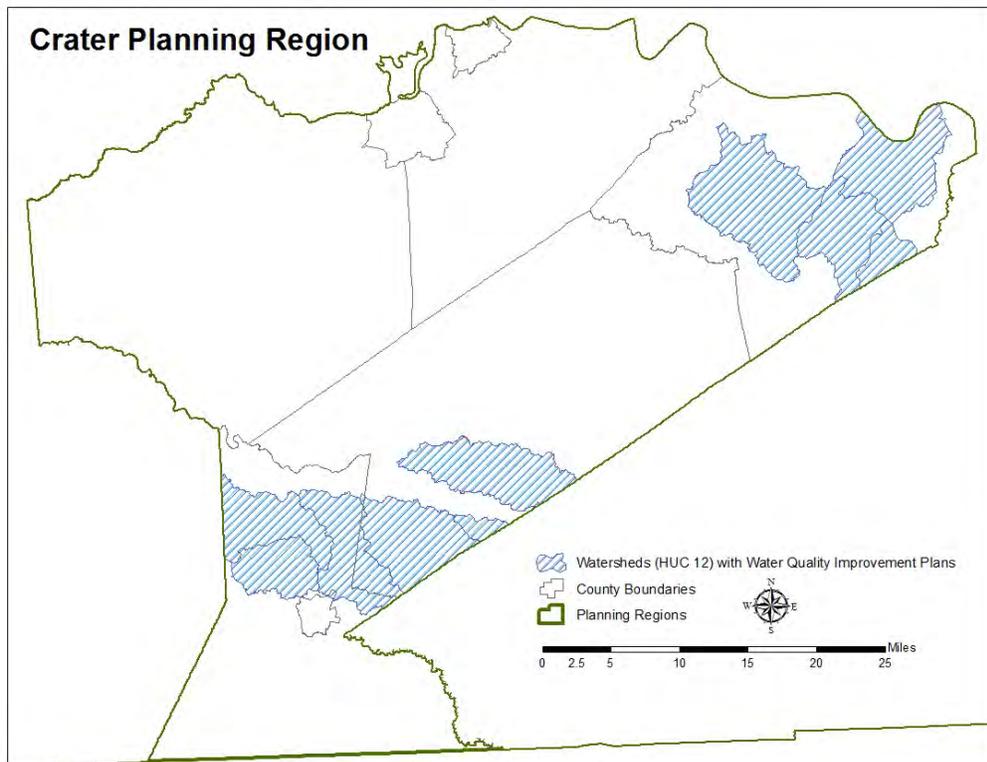


Figure 8. Watersheds with Water Quality Improvement Plans (DGIF 2015).

Each of these watersheds is designated as being impaired, and the primary actions needed to improve water quality in these watersheds include:

- Establishing riparian vegetative buffers along waterways;
- Reforesting erodible pasture lands and establishing permanent vegetative cover on critical areas;
- Establishing waste storage facilities (such as dairy lagoons or waste sheds) to better manage animal waste and prevent flow into the river;
- Establishing retention ponds, impoundments, or other features to manage and slow storm water runoff from cropland, pastures, forests, and barren lands;
- Working with landowners to implement small acreage grazing systems;
- Repairing or replacing failing septic systems and pit privies; and

- Working to prevent pet and kennel waste from entering waterways and establishing a pet litter program to encourage owners to clean up pet waste.

Members of Virginia’s conservation community may consider working in other watersheds of local significance that may not have a water quality improvement plan. In these situations, where no local preference or priorities have been identified, several common conservation actions common to most water quality and instream habitat enhancement plans can be implemented with little chance of ill consequence to wildlife or human communities downstream. Some of the most beneficial actions would include:

- Working with landowners to exclude livestock from streams;
- Restoring or enhancing vegetated riparian buffers;
- Reducing impervious surface by replacing with more porous materials or vegetation; and
- Working to enhance the health of upland forests and grassland habitats.

Many agencies help landowners in the Crater Planning Region establish vegetative buffers along waterways flowing through their properties. The Virginia Department of Forestry (DOF), Virginia Department of Agriculture and Consumer Services (VDACS), and DCR have established Best Management Practices (BMPs) for various land uses which, if implemented serve to minimize land use impacts upon adjacent and downstream waters. In addition, landowners are encouraged to work with DOF through the Forest Stewardship Program to utilize timber production BMPs, such as implementation of buffers and careful planning of roads and stream crossings (DOF 2014) and Agricultural producers are encouraged to work with VDACS and the local Soil and Water Conservation Districts to control erosion and limit runoff through the various available programs (DCR 2014). The Natural Resources Conservation Service (NRCS) provides landowners with other opportunities including the Conservation Reserve Enhancement Program, the Environmental Quality Incentives Program, and the Wetland Reserve Enhancement Program.

Additional actions to improve aquatic systems in the Crater Planning Region include: restoring aquatic connections (i.e., removing culverts, dams, etc.), monitoring and addressing invasive species impacts, and working with the planning region to adopt use practices or policies through zoning or other guidelines (e.g., impervious surface limits) to help improve the health of aquatic systems within and downstream of regions that have significant impervious surface areas. Additionally, land acquisitions or easements that will help protect the land surrounding creeks should also be considered.

### *Climate-Smart Management Actions*

When planting, restoring, or maintaining riparian buffers, managers should consider how conditions may change in the area and work with appropriate vegetation. For example, if stream flow is expected to become erratic due to increased precipitation or more frequent flooding as is projected to occur, native tree and shrub species that can tolerate flood conditions and inundation should be included in the selected plant species. Because sea-level rise will likely be an issue, tree and shrub species that have a broader salinity tolerance should be considered. Additionally, considering native species that may provide better erosion control (broader, deeper roots) than other species also could be used. Techniques and tools may be needed (e.g., fencing, biomats, etc.) to ensure success. Minimizing impervious surface will be even more important under climate change as increased storm intensity will

result in increased levels of stormwater runoff. Improving stormwater control methods, to ensure they account for predicted changes in precipitation and flow, will help minimize the future impacts of storm water under climate change (Kane 2013).

## CONSERVE AND MANAGE FOREST HABITATS

Forests make up over a third of Crater Planning Region and are important for a broad range of species (Table 5). Forest patches are made up of mixed hardwoods and conifers. Within this forest type, young forests make up a specific age class of forest, loosely defined as referring to areas dominated by woody seedlings and saplings (Covell, 2006). Previously, it might have been referred to as an early successional habitat for eastern portions of North America. Mixed hardwood and conifer forests help protect water resources within the region and provide habitat for species such as the glossy ibis, the eastern spadefoot toad, and the southeastern fox squirrel.

Table 5. Forest Acreage Totals in Crater Planning Region (Anderson et al. 2013; DGIF 2015).

Forest Type	Acres	Percent of Planning Region
<b>Mixed Hardwood and Conifer</b>	327,078.87	26.33%

### Threats

Forests within this planning region face a range of threats.

1. **Land Use Changes and Conversion:** The largest threat to mixed hardwood and conifer forests within Crater Planning Region is fragmentation, mainly due to expanding residential and commercial development and resulting roads. In many cases with urban or commercial development, the losses can be complete and have profound impacts on local wildlife species composition, water quality, and outdoor recreational opportunities. In other situations, such as conversion to pine plantations, the mixed forest habitat is lost, but the newly planted forest can be managed for several years to provide open young forest habitats that support a diversity of landowner goals, wildlife species, and recreational opportunities. If established BMPs are followed, impacts to waterways and adjoining properties can be prevented or mitigated such as through implementation of vegetative buffer areas (see below).
2. **Invasive Species:** Invasive plant species and pests are also a significant problem in this region. Of particular note is the gypsy moth. Although more prevalent in the western portion of the state, it may still affect oaks and other species within these forests (DOF 2014).
3. **Climate Change:** More intense storm events, higher temperatures, and the potential for droughts may exacerbate existing stressors as well as damage intact forests and result in more forest fires and an increase in incidence of pests.

## Conservation Management Actions

Actions for conserving mixed hardwood conifer forests in Crater Planning Region may include working to conserve, either through acquisition, easement, cooperative management, or incentives, intact forest patches capable of supporting a variety of Action Plan species. Land protection will help reduce conversion of forests to development. Additionally, working with landowners to ensure BMPs such as vegetative buffers are in place around agricultural or timber harvest areas will help prevent erosion and run off of sediments and nutrients into adjacent streams. Research demonstrates that vegetative riparian buffers can filter significant amounts of nutrient run off from timber operations and agricultural fields (DOF 2014). Some BMPs recommend a 50 foot buffer and allow some timber harvest within the buffers, while other BMPs encourage a 100 foot buffer with no harvest (DOF 2014; DGIF personal conversation). BMPs also recommend building roads on areas with minimum slope and minimizing or avoiding stream crossings (DOF 2014). The *Water Quality Improvement Plan to Reduce Bacteria in Darden Mill Run, Mill Swamp, and Three Creek* developed by DEQ and stakeholders specifically highlights reforestation areas around eroding crop lands and pastures within the Three Creek watershed to help decrease sediment run off as well as provide wildlife habitat (Working Group 2013).

Working to maintain forest health is also integral to ensuring forest habitat is available to be conserved and protected. DOF makes several key recommendations that relate to habitat health, including but not limited to using species within their native ranges, if feasible using a mix of tree species to help minimize susceptibility to pests, preventing unnecessary site disturbance, and protecting unusual (rare) forest habitats (DOF 2014). In terms of invasive species and pests, monitoring and control will be important to prevent its spread. Some of these forest habitats should be managed with thinning and prescribed burns to minimize outbreaks (Brooks and Lusk 2008; DOF 2014).

### *Climate-Smart Management Actions*

To best manage forests in the Crater Planning Region as the climate changes, it will be imperative to understand how climate may affect potential future composition of forests in Virginia and how that may affect SCGN. Conservation and management efforts may need to focus on trees that can better withstand higher salinities, increased temperatures, and drought, among other impacts. Managers may wish to consult recently available climate data through DGIF as well as the U.S. Forest Service's tree atlas when planning management and conservation of these forests. Additionally, harvest guidelines may need to be revised, depending on projections for future tree composition. Invasive species monitoring and prevention will also become even more important to include in forest management as climate change may favor some tree pests, diseases, and invasive species.

In terms of considering how to best manage for birds, mammals, and other species that depend on these forests, managers will want to try to provide refugia for SCGN as habitat is lost as well as establishing corridors both north/ south and east/west between protected areas to assist with species movements as conditions change (King and Finch 2013). It will also be important to work to maintain species diversity and continue to reduce existing stressors that will likely exacerbate impacts from climate change (McKelvey et al. 2013).

## *MAINTAIN AND RESTORE OPEN HABITATS*

Open habitats represent an assortment of habitat types that are botanically characterized by grasses, forbs, and shrubs. Trees may be present but they tend to be widely spaced and crowns do not form a canopy. DGIF biologists and partners have indicated several varieties of open habitats are important for action plan species. Open habitats are often comprised of post-agricultural lands, pine savannas, and barrens and glades and make up approximately 129,900 acres (10.5 percent) of the planning region (Anderson et al. 2013; DGIF 2105). These habitats are becoming rare in Virginia as agriculture and timber harvest practices change; however, they are important to a range of species that depend on these areas for nesting, feeding, protection, etc. This planning region contains some of the best examples of longleaf pine savanna in Virginia. Long leaf pine savanna habitat is a regionally significant resource necessary to conserve the red cockaded woodpeckers as well as Bachman's sparrow, the southern chorus frog, and other species.

### **Threats**

Changing land use patterns has played a large role in the loss of open and young forests habitats.

1. Land Use Changes: Dozens of open habitat species have been affected by changing land use and agricultural practices that resulted in either degraded or destroyed open habitats due to development or lack of agricultural management. The most serious threats to remaining open habitats within the planning involve either development (where habitats are converted for human use) or natural succession (where trees are allowed to dominate and the site eventually becomes forest).
2. Invasive Species: Invasive species are also problematic, especially tree of heaven, Japanese stilt grass, garlic mustard, and privet. These species can out-compete native open habitat species and take over the landscape. Some such as tree of heaven can change the landscape from an open habitat to a more closed habitat relatively quickly due to its ability to spread and colonize areas rapidly (VISWG 2012). Japanese stilt grass also grows quickly and in mats that can crowd out native grasses. It also alters soil pH inhibiting growth of other native plants (VISWG 2012).
3. Pine Savannas: Threats to pine savannas include lack of opportunities for restoration due to limited acreage and proximity to population centers, limiting controlled burns, which are needed to maintain these forests.

### **Conservation Management Actions**

DGIF has long recognized that the loss of open habitats, such as glades, savannas, and post-agricultural areas have caused significant declines in several Action Plan species, including the red cockaded woodpecker, the northern bobwhite, field sparrows, eastern towhees, brown thrashers, prairie warblers, and monarch butterflies. The loss of these habitats has likely contributed to the declines in native pollinator species like bumblebees (Xerces Society 2011). To address this issue, Virginia has become a leader in the National Bobwhite Conservation Initiative (NBCI). DGIF contributes to this

national effort by leading the Virginia Quail Recovery Initiative (QRI), which is a robust, state-based, multi-partner effort dedicated to conserving and restoring open habitats within Virginia.

Both the NBCI and the QRI have determined that Sussex County and Greenville County offer some of the best opportunities for restoring open habitats that support a diversity of open habitat species.

Agriculture and forestry are important industries in Virginia and landowners are important conservation partners. The QRI was created to find opportunities that help private landowners meet their economic goals while also contributing to the conservation and recovery of important wildlife and pollinator species. QRI efforts within this planning region focus on helping landowners manage retired agricultural lands and forested areas to benefit open habitat species, and DGIF provides information for landowners on its quail website (DGIF website 2015).

For landowners seeking to improve the habitat quality of pastures and field edges, the QRI generally recommends removing nonnative grasses and invasive species. In many instances, a sufficient seedbank of native species will exist in the soil to allow the restoration of native plant communities and replanting will likely not be required. Once a native plant community has been established, the QRI recommends managing these habitats either through burning, disking, or (least favorable) mowing. Additionally, within *Managing Pines for Profit and Wildlife* biologists describe landowner opportunities create a commercially viable forest plot that also benefits open habitat species such as quail. Recommendations are provided for site preparation, planting density, pre-commercial thinning, hardwood and grass suppression, commercial thinning, and post-thinning management (DGIF 2008).

This planning region also contains some of the best examples of remaining long-leaf pine savanna in Virginia. Almost all of these sites are owned and managed by government agencies or The Nature Conservancy. Although once a critical economic commodity for Virginia's maritime industries, the economic value of long-leaf pine has been overshadowed by the faster growing, and more commercially viable, loblolly pine. As such, few individual landowners have the economic ability to restore large areas of long-leaf pine on their properties to maintain savanna conditions. Opportunities to create new savanna habitats within this planning region will depend upon the conservation community acquiring properties with suitable soil conditions and managing these properties for savanna conditions. Properties near or adjacent to existing savannas should be considered a conservation priority.

### ***Climate-Smart Management Actions***

Changes in temperature and precipitation regimes could negatively affect open lands as temperatures increase and summers become drier and more drought prone. However, research is showing that many species that make up open habitats are already relatively drought tolerant, meaning that open lands may not be as affected by climate change as other habitats if they can maintain their diverse mix of vegetation species (Craine et al. 2012). It is important to note that if there is extended severe drought, open lands may succumb over time (Craine et al. 2012). To maintain diversity and help build resiliency in open lands within this planning region, it will be important to implement the management options above, especially focusing on removing non-natives and ensuring a diverse mix of vegetation species. Additionally, working to protect and preserve larger tracts of grasslands will help provide refugia for the species that depend on this habitat.

## CONCLUSION

The development of the Virginia Wildlife Action Plan presented a unique opportunity for the Commonwealth—an opportunity not only to assess the condition and status of the state’s wildlife and habitat resources, but to provide a shared vision and purpose in the management and conservation of this “common wealth.” The true value of this initiative is this recognition of common interests and the enhancement of existing and fostering of new partnerships to address issues of mutual concern. The Action Plan’s long-term success will be borne out in the implementation of the recommended actions by partners across the state and the effectiveness with which conservation partners collectively manage these natural resources.

This Local Action Plan Summary aims to prioritize species, habitats, and conservation actions within this planning region, so that partners that work within this region can use limited resources to greatest effect. However, Virginia faces serious issues. Not addressing these problems would risk more species becoming threatened or endangered, the quality of our land and water would decline, and Virginians could lose important pieces of our natural heritage that contribute to our quality of life. However, there are significant opportunities to do valuable things for wildlife and people in the planning region. Our problems are not insurmountable and most can be addressed with proven management techniques.

Working to maintain and protect existing high quality habitat will be a priority before restoration; however, restoration is still an important action and necessary in many cases. Within the Crater Planning Region, priority conservation opportunities include:

- Improving the quality and quantity of water in creeks and rivers through best management practices and water quality improvement mechanisms;
- Protecting and restoring tidal and non-tidal wetlands;
- Conserving tracts of mature hardwood forests; and
- Protecting and restoring open habitats.

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## APPENDIX A. COMPLETE LIST OF SPECIES OF GREATEST CONSERVATION NEED IN CRATER PLANNING REGION

Complete SGCN list for the Crater Planning Region (SGCN=121). Table includes federal and state statuses, Wildlife Action Plan Tier and Conservation Opportunity Rankings, and proportion of species state distribution within the planning region based on hydrologic unit (HUC12) and habitat (linear stream reaches for aquatic species and total species area for terrestrial species) analyses. Species are listed in descending order by the proportion of a species total state distribution located within the planning region.

Conservation Status	Tier	Opportunity Ranking	Common Name	Scientific Name	% State Distribution (HUC12 Analysis)	% State Distribution (Habitat Analysis)	
<b>FESE</b>	I	a	Red-cockaded woodpecker	<i>Picoides borealis</i>	88.76	#N/A	
	III	b	Southeastern fox squirrel	<i>Sciurus niger niger</i>	75.96	#N/A	
	III	c	Dwarf waterdog	<i>Necturus punctatus</i>	59.11	#N/A	
	IV	c	Lined topminnow	<i>Fundulus lineolatus</i>	56.73	#N/A	
<b>SE</b>	I	a	Blackbanded sunfish	<i>Enneacanthus chaetodon</i>	56.72	62.78	
<b>FS</b>	III	c	Chowanoke crayfish	<i>Orconectes virginiensis</i>	56.13	#N/A	
	IV	c	Ridged lioplax	<i>Lioplax subcarinata</i>	51.31	#N/A	
	IV	c	Many-lined salamander	<i>Stereochilus marginatus</i>	49.89	#N/A	
	IV	c	Southern chorus frog	<i>Pseudacris nigrita</i>	47.09	#N/A	
	IV	c	Lake chubsucker	<i>Erimyzon sucetta</i>	44.73	#N/A	
	IV	c	Banded sunfish	<i>Enneacanthus obesus</i>	40.66	#N/A	
	IV	c	Sharp sprite	<i>Promenetus exacuosis</i>	39.26	#N/A	
	IV	a	Carolina slabshell mussel	<i>Elliptio congaraea</i>	38.13	#N/A	
	III	c	Ironcolor shiner	<i>Notropis chalybaeus</i>	34.42	#N/A	
	II	c	Oak toad	<i>Anaxyrus quercicus</i>	34.41	46.02	
	IV	c	Mudsnake	<i>Farancia abacura abacura</i>	31.65	#N/A	
	IV	c	Marsh rabbit	<i>Sylvilagus palustris palustris</i>	31.23	#N/A	
	<b>ST</b>	I	a	Bachman's sparrow	<i>Aimophila aestivalis</i>	30.29	56.59
	<b>FESE</b>	I	a	Dwarf wedgemussel	<i>Alasmidonta heterodon</i>	29.24	27.83
IV		b	Southeastern myotis	<i>Myotis austroriparius</i>	28.15	#N/A	
IV		c	Gravel elimia	<i>Elimia catenaria</i>	27.41	#N/A	
IV		c	Mud sunfish	<i>Acantharchus pomotis</i>	27.34	#N/A	
IV		c	Little grass frog	<i>Pseudacris ocularis</i>	27.27	#N/A	

	IV	c	Cotton mouse	<i>Peromyscus gossypinus gossypinus</i>	26.39	#N/A
	IV	c	Rainbow snake	<i>Farancia erythrogramma erythrogramma</i>	25.81	#N/A
<b>ST</b>	II	c	Barking treefrog	<i>Hyla gratiosa</i>	25.61	2.57
<b>SE</b>	I	a	Rafinesque's eastern big-eared bat	<i>Corynorhinus rafinesquii macrotis</i>	24.31	5.37
	IV	c	Yellow-bellied slider	<i>Trachemys scripta scripta</i>	23.38	#N/A
	IV	a	Alewife floater	<i>Anodonta implicata</i>	20.94	#N/A
	IV	c	Greater siren	<i>Siren lacertina</i>	20.84	#N/A
<b>FS</b>	II	b	Roanoke slabshell	<i>Elliptio roanokensis</i>	20.23	19.28
	III	c	Lesser siren	<i>Siren intermedia intermedia</i>	17.81	#N/A
	I	a	Bridle shiner	<i>Notropis bifrenatus</i>	17.01	6.07
<b>FESE</b>	II	a	Roanoke logperch	<i>Percina rex</i>	17.00	17.41
	I	a	Roanoke bass	<i>Ambloplites cavifrons</i>	16.56	18.36
	III	a	Black-crowned night-heron	<i>Nycticorax nycticorax hoactii</i>	15.44	#N/A
	II	a	Yellow lampmussel	<i>Lampsilis cariosa</i>	14.26	#N/A
	IV	c	American brook lamprey	<i>Lampetra appendix</i>	14.22	#N/A
	IV	c	Scarletsnake	<i>Cemophora coccinea copei</i>	14.13	#N/A
	IV	b	Northern lance mussel	<i>Elliptio fisheriana</i>	13.36	#N/A
	IV	a	Alewife	<i>Alosa pseudoharengus</i>	13.36	#N/A
	IV	a	American shad	<i>Alosa sapidissima</i>	13.14	#N/A
<b>FS</b>	II	c	Rare skipper	<i>Problema bulenta</i>	12.62	18.87
<b>CC</b>	III	c	Spotted turtle	<i>Clemmys guttata</i>	12.57	#N/A
	IV	c	Eastern slender glass lizard	<i>Ophisaurus attenuatus longicaudus</i>	11.64	#N/A
<b>ST</b>	II	c	Mabee's salamander	<i>Ambystoma mabeei</i>	11.57	32.51
	IV	a	Eastern pondmussel	<i>Ligumia nasuta</i>	11.02	#N/A
	IV	b	Clapper rail	<i>Rallus longirostris crepitans</i>	10.27	#N/A
	IV	c	Eastern spadefoot	<i>Scaphiopus holbrookii</i>	10.18	#N/A
	III	c	Carpenter frog	<i>Lithobates virgatipes</i>	9.59	#N/A
	IV	a	Short-billed dowitcher (migrant)	<i>Limnodromus griseus</i>	9.53	#N/A
<b>FC</b>	I	a	Red knot (migrant)	<i>Calidris canutus rufus</i>	9.34	#N/A
<b>FS</b>	II	a	Yellow lance	<i>Elliptio lanceolata</i>	9.11	#N/A
	III	a	American eel	<i>Anguilla rostrata</i>	8.87	#N/A
<b>ST</b>	II	c	Whitemouth shiner	<i>Notropis alborus</i>	8.63	#N/A
	III	b	Least bittern	<i>Ixobrychus exilis exilis</i>	8.31	#N/A
<b>FSST</b>	I	a	Atlantic pigtoe	<i>Fusconaia masoni</i>	7.85	11.67
	IV	a	Greater scaup (winter)	<i>Aythya marila</i>	7.27	#N/A
	I	b	Atlantic sturgeon	<i>Acipenser oxyrinchus</i>	6.74	15.29
<b>SE</b>	II	a	Canebrake rattlesnake	<i>Crotalus horridus (canebrake)</i>	6.49	<0.01

IV	a	Dunlin (winter)	<i>Calidris alpina hudsonia</i>	6.46	#N/A
IV	c	Eastern mud salamander	<i>Pseudotriton montanus montanus</i>	6.10	#N/A
IV	c	Eastern hog-nosed snake	<i>Heterodon platirhinos</i>	5.48	#N/A
IV	b	Virginia rail	<i>Rallus limicola</i>	5.23	#N/A
III	a	Barn owl	<i>Tyto alba pratincola</i>	4.75	#N/A
IV	a	Grasshopper sparrow	<i>Ammodramus savannarum pratensis</i>	4.67	#N/A
IV	a	Black-and-white warbler	<i>Mniotilta varia</i>	4.58	#N/A
II	a	American woodcock	<i>Scolopax minor</i>	4.58	#N/A
IV	c	Northern rough-winged swallow	<i>Stelgidopteryx serripennis</i>	4.58	#N/A
III	a	Kentucky warbler	<i>Oporornis formosus</i>	4.57	#N/A
IV	a	Yellow-breasted chat	<i>Icteria virens virens</i>	4.57	#N/A
II	a	American black duck	<i>Anas rubripes</i>	4.57	#N/A
IV	b	Green heron	<i>Butorides virescens</i>	4.57	#N/A
III	a	Eastern Whip-poor-will	<i>Caprimulgus vociferus</i>	4.57	#N/A
IV	b	Chimney swift	<i>Chaetura pelagica</i>	4.57	#N/A
III	a	Yellow-billed cuckoo	<i>Coccyzus americanus</i>	4.57	#N/A
III	a	Northern bobwhite	<i>Colinus virginianus</i>	4.57	#N/A
IV	b	Eastern wood-pewee	<i>Contopus virens</i>	4.57	#N/A
II	a	Cerulean warbler	<i>Dendroica cerulea</i>	4.57	#N/A
IV	a	Gray catbird	<i>Dumetella carolinensis</i>	4.57	#N/A
IV	b	Wood thrush	<i>Hylocichla mustelina</i>	4.57	#N/A
IV	a	Eastern towhee	<i>Pipilo erythrophthalmus</i>	4.57	#N/A
IV	a	Field sparrow	<i>Spizella pusilla</i>	4.57	#N/A
IV	a	Eastern meadowlark	<i>Sturnella magna</i>	4.57	#N/A
IV	a	Brown thrasher	<i>Toxostoma rufum</i>	4.57	#N/A
IV	a	Eastern kingbird	<i>Tyrannus tyrannus</i>	4.57	#N/A
IV	b	Canada warbler	<i>Wilsonia canadensis</i>	4.57	#N/A
III	c	Eastern box turtle	<i>Terrapene carolina carolina</i>	4.55	#N/A
III	a	Notched rainbow	<i>Villosa constricta</i>	4.44	#N/A
IV	c	Common ribbonsnake	<i>Thamnophis sauritus sauritus</i>	4.15	#N/A
IV	c	Carolina lance mussel	<i>Elliptio angustata</i>	3.83	#N/A
IV	a	Bicknell's thrush (migrant)	<i>Catharus bicknelli</i>	3.74	#N/A
IV	b	Rusty blackbird (migrant)	<i>Euphagus carolinus</i>	3.71	#N/A
IV	c	Least brook lamprey	<i>Lampetra aepyptera</i>	3.69	#N/A
IV	a	Triangle floater	<i>Alasmidonta undulata</i>	3.69	#N/A
II	a	Common tern	<i>Sterna hirundo</i>	3.62	#N/A
III	a	Forster's tern	<i>Sterna forsteri</i>	3.57	#N/A

	I	a	Glossy ibis	<i>Plegadis falcinellus</i>	2.94	#N/A
	II	b	King rail	<i>Rallus elegans</i>	2.87	0.05
	III	a	Northern harrier	<i>Circus cyaneus</i>	2.79	#N/A
	IV	b	Seaside sparrow	<i>Ammodramus maritimus</i>	2.38	#N/A
<b>ST</b>	II	a	Green Floater	<i>Lasmigona subviridis</i>	2.16	2.35
	IV	c	Southeastern crowned snake	<i>Tantilla coronata</i>	2.11	#N/A
	IV	a	Creeper	<i>Strophitus undulatus</i>	1.99	#N/A
	II	b	Swainson's warbler	<i>Limnothlypis swainsonii</i>	1.92	#N/A
<b>CC</b>	II	b	Northern diamond-backed terrapin	<i>Malaclemys terrapin terrapin</i>	1.89	<0.01
	IV	a	Marbled godwit (migrant)	<i>Limosa fedoa</i>	1.80	#N/A
	IV	b	Marsh wren	<i>Cistothorus palustris</i>	1.33	#N/A
	I	a	Black rail	<i>Laterallus jamaicensis</i>	0.93	#N/A
<b>ST</b>	I	a	Peregrine falcon	<i>Falco peregrinus</i>	0.84	#N/A
<b>ST</b>	I	a	Henslow's sparrow	<i>Ammodramus henslowii</i>	0.81	#N/A
	IV	c	Queen snake	<i>Regina septemvittata</i>	0.75	#N/A
	I	b	Northern saw-whet owl	<i>Aegolius acadicus</i>	0.42	#N/A
	IV	c	Atlantic spike	<i>Elliptio producta</i>	0.42	#N/A
<b>ST</b>	I	a	Loggerhead shrike	<i>Lanius ludovicianus</i>	0.41	1.81
	IV	a	Whimbrel (migrant)	<i>Numenius phaeopus</i>	0.26	#N/A
	IV	c	Purple sandpiper (winter)	<i>Calidris maritima</i>	0.26	#N/A
	III	a	Atlantic Brant (winter)	<i>Branta bernicla brota</i>	0.23	#N/A
	IV	a	Black-bellied plover (winter)	<i>Pluvialis squatarola</i>	0.19	#N/A
	III	a	Least tern	<i>Sterna antillarum</i>	<0.01	#N/A
	III	c	Glossy crayfish snake	<i>Regina rigida rigida</i>	<0.01	#N/A

## ANALYSIS UNITS

The species data was analyzed within three spatial units for Virginia: county, planning district commission (PDC), and hydrologic unit (HU6). The source spatial data for these units were provided by Virginia Department of Game and Inland Fisheries (VDGIF). The analysis extent was constrained to that of the Virginia counties, so that portions of the PDC and HU6 units falling outside of the county boundaries were eliminated from the analysis. Each of the 21 PDC units was assigned an alphabetic code (e.g. Accomack-Northampton = "ACNO"). Nottoway County does not fall within the jurisdiction of any Virginia PDC and was not included in any of our analyses.

## SPECIES DATA

The source data for the species analysis consisted of three datasets, all of which were provided by VDGIF: aquatic tier I-II plus species, terrestrial potential and confirmed species, and peer-reviewed HU6 species. Within these datasets, individual species are identified by Biota of Virginia (BOVA) code.

## METHODS

### *AQUATIC SPECIES*

The aquatic species are represented in the source dataset by linear stream segments, or reaches. For each BOVA code present, the total length was calculated for all assigned reaches within the analysis extent. The dataset was then divided by the three analysis units, and the total BOVA length was summarized again by county, PDC, and HU6. The BOVA percent of total length was calculated by dividing the species length for the analysis unit by the total species length.

### *TERRESTRIAL SPECIES*

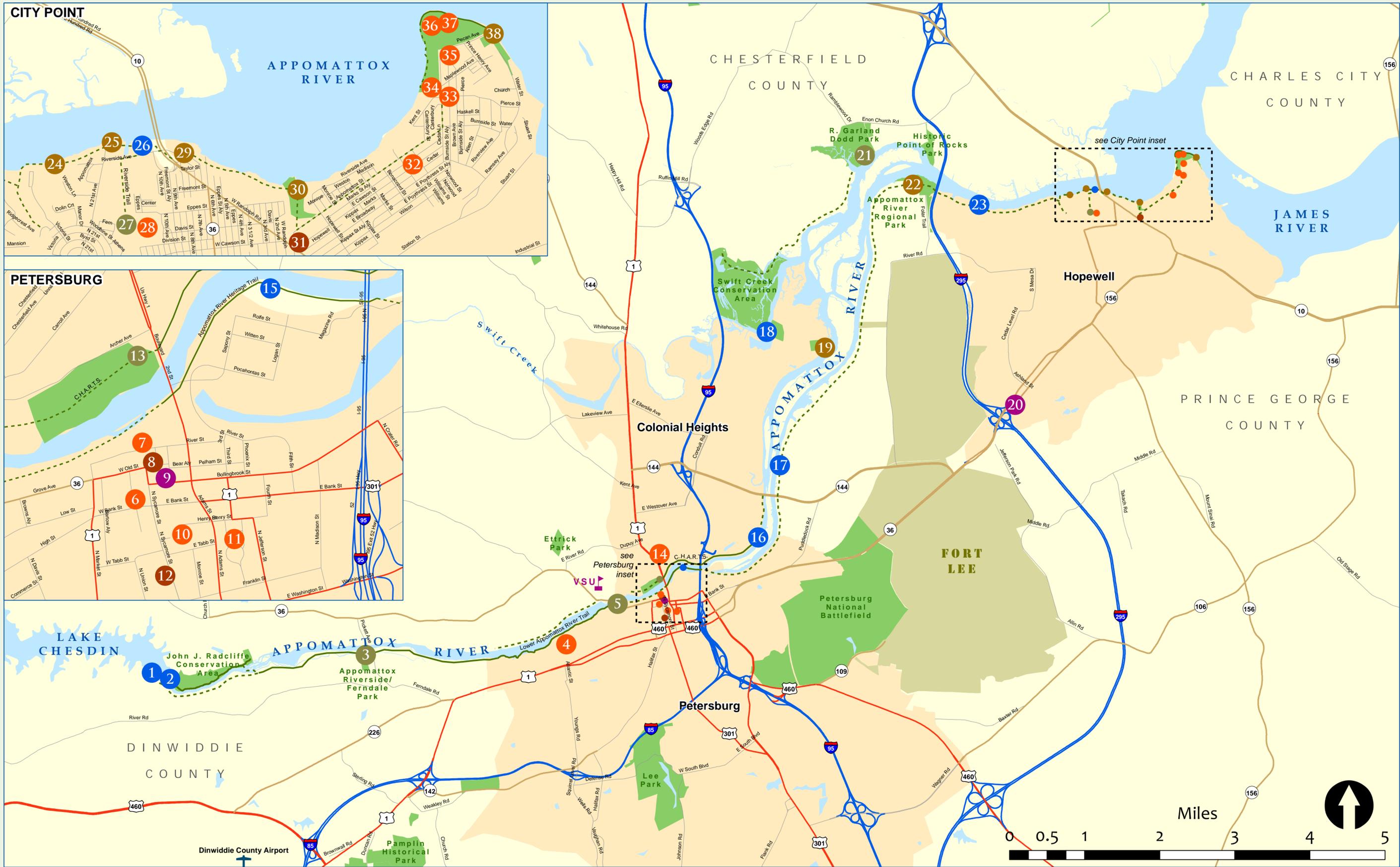
The terrestrial species are represented in the source dataset by area. For each BOVA code present, the total area was calculated within the analysis extent. The dataset was then divided by the three analysis units, and the total BOVA area was summarized again by county, PDC, and HU6. The BOVA percent of total area was calculated by dividing the species area for the analysis unit by the total species area in Virginia.

### PEER-REVIEWED HU6 SPECIES

The peer-reviewed species are represented in the source dataset by 6<sup>th</sup> order hydrologic units. For each BOVA code present, the total area was calculated within the analysis extent. The dataset was then divided by the county and PDC analysis units, and the total BOVA area was summarized by county, PDC, and HU6. The BOVA percent of total area was calculated by dividing the species area for the analysis unit by the total species area.

### *PRIORITY SGCN*

For each PDC, priority species were identified as those SGCNs with a total PDC unit area or length  $\geq$  10% of the total SGCN area or length for Virginia. SGCN unit calculations were drawn from only one of the source datasets: if an SGCN was present in both the aquatic dataset and the HU6 dataset, then the aquatic dataset took preference; and if an SGCN was present in the terrestrial dataset and the HU6 dataset, then the terrestrial dataset took preference.



- |                    |                |                |               |
|--------------------|----------------|----------------|---------------|
| Water Feature      | Cultural Site  | Existing Trail | U.S. Route    |
| Outdoor Recreation | Historic Site  | Proposed Trail | State Route   |
| Overlook           | Visitor Center | Interstate     | Local Roadway |

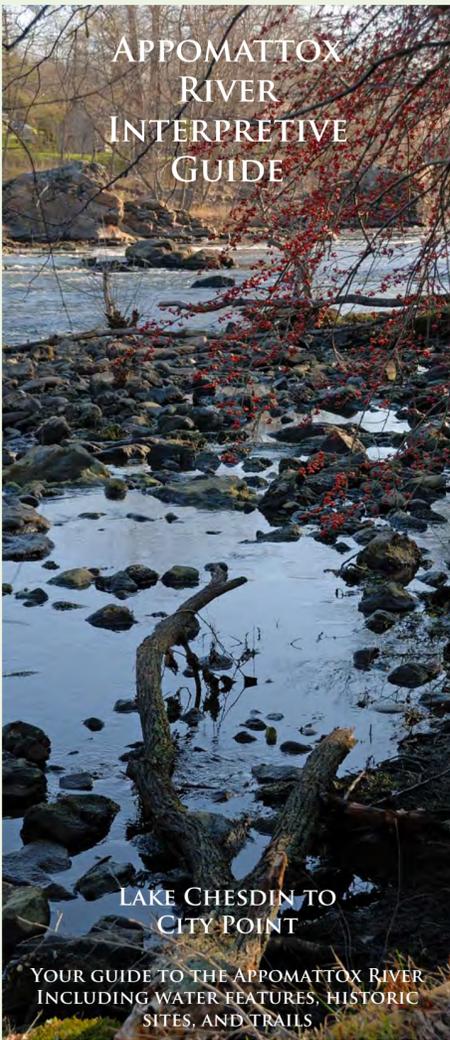
# APPOMATTOX RIVER INTERPRETIVE GUIDE

# APPOMATTOX RIVER INTERPRETIVE GUIDE

# APPOMATTOX RIVER INTERPRETIVE GUIDE



PRODUCED BY THE CRATER PLANNING DISTRICT COMMISSION  
SEPTEMBER 2015



## LAKE CHESDIN TO CITY POINT

YOUR GUIDE TO THE APPOMATTOX RIVER INCLUDING WATER FEATURES, HISTORIC SITES, AND TRAILS

### 1 LAKE CHESDIN BOAT RAMP

Lake Chesdin is a 3,100-acre water supply reservoir on the Chesterfield-Dinwiddie County line administered by the Appomattox River Water Authority. Chesdin is a very productive lake that offers excellent largemouth bass fishing, good crappie fishing (both black and white) in spring and fall, and a great channel catfish fishery. The public boat ramp and handicap-accessible fishing pier are open 24 hours a day.  
*Chesdin Lake Road (Dinwiddie County)*

### 2 JOHN J. RADCLIFFE CONSERVATION AREA & APPOMATTOX RIVER CANOE/KAYAK LAUNCH

These areas provide trail and boat access along the fall zone of the Appomattox River. Hikers can explore 2.6 miles of trails. Canoeists and kayakers can float down one mile to the abutment dam (relatively flat water). Or they can float three miles down to Appomattox Riverside/Ferndale Park (Class II-III whitewater) or seven miles down to Petersburg (Class II-III whitewater).  
*21300 Chesdin Road (Chesterfield County)*

### 3 APPOMATTOX RIVERSIDE/FERNDAL PARK

The Appomattox River is a Virginia State Scenic River and deservedly so. Spectacular views of the river are obtainable from the trails that begin at the old visitor's center. The mosaic of habitats should be attractive to wildlife during any season. Look for mallards and other waterfowl, great blue heron, bald eagle and osprey all hunting and feeding along the river. American sycamore is the dominant tree species in the riparian zone. Shrubby vegetation along the banks provides both shelter and food for birds such as northern cardinal, Carolina wren, eastern towhee and yellow-rumped warbler. A maintained power line cut is heavily vegetated with warm season grasses, broad-leaf herbs and small shrubs. The sustained early successional habitat attracts many types of birds, such as sparrows feeding on seed heads, especially in the fall. Return to the parking lot and explore the mixed woodlands where pine warblers can be heard making their presence known to prospective mates. Woodpeckers, including pileated, downy, and red-bellied, work the woods in search of hidden insect larvae. Also look for tufted titmouse, Carolina chickadee, American crow, fish crow, and ruby-crowned kinglet.  
*Ferndale Road (Dinwiddie County)*

### 4 BATTERSEA

Built in 1768 on the banks of the Appomattox River for Colonel John Banister, Petersburg's first mayor, Revolutionary War Patriot and framer of the Articles of Confederation, Battersea is an important colonial urban villa. It is built in the neo-Palladian style that was popularized in England in the eighteenth century and embraced in Colonial Virginia, and features a spectacular Chinese Chippendale staircase. Each year on the third weekend in April, Battersea is the setting of a commemorative reenactment of the Battle of Petersburg fought on April 25, 1781.  
*1289 Upper Appomattox Street (Petersburg)*

### 5 PATTON PARK

A passive recreation area filled with walking and jogging trails. The park also features parking, a canoe/kayak takeout, a picnic area, pavilion, barbecue pits, and a New England-style covered bridge.  
*Squaw Alley (Petersburg)*

### 6 SIEGE MUSEUM

Housed in the ca. 1839 Exchange Building, the Siege Museum interprets civilian life in Petersburg before, during, and immediately after the Civil War. Through artifacts, documents and photographs, emphasis is given to the ten-month siege of Petersburg (June 1864 - April 1865) - the longest period of time that an American city has been under a military siege. The exhibition illustrates how the siege impacted civilian life in Petersburg.  
*15 West Bank Street (Petersburg)*

### 7 SOUTH SIDE DEPOT

Built in 1854, this depot served the South Side Railroad line, the last railroad left operating during the Siege of Petersburg. When Union troops finally severed the rail line, it ensured the surrender of Petersburg and Richmond, bringing the war to an end. South Side Depot will serve as a visitor contact station for Petersburg National Battlefield beginning in the Summer of 2015.  
*37 River Street (Petersburg)*

### 8 PETERSBURG AREA ART LEAGUE

The Petersburg Area Art League showcases the works of local artists through exhibitions that change on the second Friday of each month to coincide with the "Friday For The Arts!" event in Old Towne Petersburg. The local artists create works in oils, watercolors, acrylics, pastels, jewelry, sculpture and mixed media. For over 70 years resident artists have conducted art lessons on-site for local students. Original works and prints are available for sale.  
*7 East Old Street (Petersburg)*

### 9 PETERSBURG VISITOR CENTER/FARMERS BANK

One of the oldest bank buildings in the United States, the Farmers Bank was built in 1817. During the Siege of Petersburg, the building was hit by three shell fragments and went bankrupt in 1865 after investing in Confederate bonds. The Visitor Center is currently housed here but is planned for relocation in 2016.  
*19 Bollingbrook Street (Petersburg)*

### 10 PETERSBURG COURTHOUSE

The Petersburg Courthouse, built between 1837 and 1839, was the official Confederate headquarters during the Siege of Petersburg. On April 20, 1861, local volunteers formed in its square to enlist. On June 9, 1864, its bell sounded the warning for the local militia to meet the advancing Union cavalry. During the Siege, soldiers from both sides could see the courthouse clock from the trenches and they set their timepieces by it. The clock tower was a favorite target of Union artillery, who poured an estimated 20,000 shells into the city. When Petersburg fell on April 3, 1865 a Union flag waved above it.  
*150 North Sycamore Street (Petersburg)*

### 11 CENTRE HILL MANSION

Built in 1823 by Robert Bolling IV, Centre Hill Mansion remained an opulent Petersburg residence until 1936. The interior features outstanding examples of Greek revival architectural ornamentation as well as earlier Federal style and later Colonial Revival style architectural modifications. Through guided tours, visitors learn about the history of Centre Hill, including its role during the Civil War and the two Presidential visits to the house. Examples of eighteenth, nineteenth and twentieth century decorative arts, many from the Petersburg area, are also exhibited. Visitors can also view the tunnel, constructed in the 1840s that led from the back of the house to nearby Henry Street.  
*1 Centre Hill Avenue (Petersburg)*

### 12 THE WARD CENTER FOR CONTEMPORARY ART

Housed in an historic structure built in 1858, the Art Center is a facility where local and regional artists create and showcase their work. The public is invited to view the ever changing exhibits, meet the artists and purchase their works.  
*132 North Sycamore Street (Petersburg)*

### 13 APPAMATUCK PARK

This planned park will have a canoe and kayak launch, fishing pier, recreational facilities and a trailhead, as well as be part of the Colonial Heights Appomattox River Trail System (C.H.A.R.T.S.).  
*Archer Avenue (Colonial Heights)*

### 14 VIOLET BANK MUSEUM

With an interpretive period spanning over half a century, from 1815 to 1873, the Museum maintains a wide array of artifacts: guns, furniture, glass & ceramics, textiles, accoutrements, books, swords, and other items. Owned and operated by the City of Colonial Heights, The Violet Bank Museum boasts some of the most sophisticated and beautiful Adam-style ceiling moldings in the country, as well as original woodwork, doors, fireplaces and floors. Violet Bank served as General Robert E. Lee's Headquarters from June 8, 1864 to November 1, 1864.  
*300 Virginia Avenue (Colonial Heights)*

### 15 POCAHONTAS ISLAND

Named after the legendary Indian Princess, Pocahontas Island is Petersburg's earliest predominantly African-American neighborhood. Home to the largest populations of free African Americans during the 1800's. John Stewart, who was born on the 66-acre island in 1943, purchased an 18th century house there in 2002 and began collecting and amazing artifacts related to black history. By 2004, he had collected enough items to open the house as the Pocahontas Island Museum. It includes everything from a mysterious military trunk to photographs of the headstones of free slaves of Pocahontas Island. On the National Register of Historic Places. There is a public park and non-motorized boat access area.  
*Rolfe Street (Petersburg)*

### 16 ROSLYN LANDING PARK

This park has a ramp for launching small boats and a pier for fishing, as well as the first phase of the Colonial Heights Appomattox River Trail system.  
*East Roslyn Road (Colonial Heights)*

### 17 APPOMATTOX BOAT HARBOR

Privately-owned but publicly accessible. Slips and ramp available for a variety of boats.  
*1604 Fine Street (Prince George County)*

### 18 WHITE BANK PARK

The park consists of 22 acres which overlook Swift Creek, and is located across from Tussing Elementary School on White Bank Park Road. The park includes two picnic pavilions which accommodate 200 - 300 people each, and 8 individual picnic shelters for smaller groups.  
*White Bank Park Road (Colonial Heights)*

### 19 FORT CLIFTON PARK

Fort Clifton was a Confederate stronghold on the Appomattox River, serving as an important link in the line that defended Richmond and Petersburg in 1864 and 1865. Located on a high bluff at the junction of the Appomattox River and Swift Creek, the fort controlled navigation on the river north of Petersburg and was a formidable defensive bastion that wasn't taken by Union forces until the fall of Petersburg on April 3, 1865.  
*5501 Conduit Road (Colonial Heights)*

### 20 HOPEWELL/PRINCE GEORGE VISITOR CENTER

The Hopewell/Prince George Visitor Center offers one-stop shopping including statewide tourist literature, lodging coupons, maps, local attractions, and relocation information.  
*4100 Oaklawn Boulevard (Hopewell)*

### 21 R GARLAND DODD PARK

This 178-acre park offers 3 miles of trails providing access to several habitats, including eastern deciduous forest, the banks of the Appomattox River, and tidal freshwater marsh. The forest edge may be entered from several parking lots behind the tennis courts where there are also picnic facilities. The trails through the forest offer viewing access for a variety of typical eastern birds. As the forest trails yield to the freshwaters of Ashton Creek Marsh, the trail continues as a floating boardwalk. The boardwalk provides an excellent place to study a number of wetland birds and dragonflies. Watch the marsh for wetland songbirds such as swamp sparrows and common yellowthroat in addition to the waders and bald eagles.  
*201 Enon Church Road (Chesterfield County)*

### 22 APPOMATTOX RIVER REGIONAL PARK

Over 65 acres of pristine woods on the river holding 1.5 miles of trail, this recently created park offers fishing, bird watching, hiking, picnic pavilions, a canoe/kayak launch, an observation pier, a fitness trail, and restrooms.  
*800 Folar Trail (Prince George County)*

### 23 ANCHOR POINT MARINA

The Anchor Point Marina, a separate facility to serve both Anchor Point residents and the general public, provides wet/ dry slips, and small boats/ canoes are welcomed. Future plans include additional dry storage slips, two private lakes, a recreation center with tennis courts, swimming pool and walking trails.  
*303 Beacon Ridge Drive (Hopewell)*

### 24 WESTON PLANTATION

Listed on the National Register of Historical Places, Weston Plantation is considered notable for preserving much of its original interior, especially its distinctive moldings, wainscoting and chair rails. The main house was built in 1789 and overlooks the Appomattox River. It has been described by one Virginia historian as a classic example of Virginia Georgian architecture and the very essence of the Tidewater plantation mansion. All three floors and the kitchen dependency are furnished with antiques and reproductions and open to the public through guided tours. It has a fishing pier open to the public free of charge.  
*21<sup>st</sup> Avenue and Weston Lane (Hopewell)*

### 25 RIVERSIDE HARBOR PARK

A picnic pavilion overlooking the Appomattox River with large swings, a picnic shelter, picnic tables, an open play area, and parking.  
*910 North 21<sup>st</sup> Street (Hopewell)*

### 26 HOPEWELL MARINA

Public, municipal marina with slip rentals, ship store, restroom/ shower facilities, four-lane ramp for motorized craft, ADA accessible canoe and kayak launch, fishing area with pier, picnic tables, and ample parking.  
*1051 Riverside Avenue (Hopewell)*

### 27 RIVERSIDE PARK

A Specialty Park with basketball courts, tennis courts, water fountain, baseball/softball, an open play area, restrooms and parking.  
*12<sup>th</sup> Avenue and Division Street (Hopewell)*

### 28 CITY POINT NATIONAL CEMETERY

City Point (today's Hopewell) served as General Grant's headquarters during the Siege of Petersburg. Seven hospitals there administered most of the care for the injured and mortally wounded. Casualties were originally interred in burial grounds near the hospitals. Later they were re-interred at City Point National Cemetery. More than 5,200 Federals are buried there, including at least 1,000 African-Americans who died fighting for the Union. The cemetery was listed on the National Register of Historic Places in 1995.  
*10<sup>th</sup> Avenue at Davis Street (Hopewell)*

### 29 EVERGREEN OVERLOOK

This river overlook provides opportunities to view wildlife including eagles, ospreys and great blue herons. The site is accessible from Riverside Drive off Randolph Road near the C. Hardaway Marks Bridge. The overlook has a view of the Appomattox River as it flows toward its confluence with the James River.  
*Riverside Drive and Randolph Road (Hopewell)*

### 30 CITY PARK

Located off of Appomattox Street across from the new Appomattox Regional Library. Trails, benches, fishing, a walking bridge crossing and a wonderful view of the Appomattox River.  
*205 Appomattox Street (Hopewell)*

### 31 BEACON THEATRE

One of Hopewell's most visible landmarks, the Beacon Theatre opened in 1928 and captured the hearts of film goers until its closing in 1981. An ambitious restoration effort begun in 1987 has made it a one-of-a-kind entertainment and meetings venue. The completely remodeled reception area, conference center and grand ballroom feature soaring cathedral ceilings, expansive picture windows, distinctive Brazilian cherry hardwood floors and Italian tile work. The facility hosts a year-round schedule of musical, artistic and performing arts events, as well as weddings, balls and corporate meetings.  
*401 North Main Street (Hopewell)*

### 32 UNION FORT

Specialty Park/historical area and gazebo, located at Appomattox Street, with picnic tables, horseshoes and an open play area.  
*Appomattox Street (Hopewell)*

### 33 CITY POINT OPEN AIR MUSEUM

City Point, the oldest part of Hopewell, was founded in 1613 by Sir Thomas Dale for the Virginia Company. Its strategic location on a bluff overlooking the confluence of the James and Appomattox Rivers ensured a key role in Virginia's history. A Revolutionary War skirmish took place on its banks. General Ulysses S. Grant directed the ten-month Siege of Petersburg from the grounds of Appomattox Plantation. Overnight the tiny village became one of the world's busiest ports, supplying 100,000 Union troops. A pleasant walking tour highlights 25 historic homes and structures, with most focusing on City Point's Civil War history. Outdoor storyboards located throughout the historic area enhance the visitor's experience. Beautiful views of the James and Appomattox Rivers add to the charm.  
*505 Cedar Lane to Water Street (Hopewell)*

### 34 HUNTER HOUSE

This historic residence is proposed for renovation to serve as a City Museum and Visitor Contact Station for the National Park Service and Petersburg National Battlefield. The Museum would provide a permanent residence for various historical artifacts and promote understanding of past history in order to inform the present and create a better quality of life. The Museum would house historical collections of maps, photographic images, artifacts and exhibits to include interactive technologies.  
*510 Cedar Lane (Hopewell)*

### 35 CITY POINT EARLY HISTORY MUSEUM

The City Point Early History Museum displays exhibitions highlighting the rich history of the area. It is housed in the St. Dennis Chapel in the National Historic District of Hopewell. The Museum is located in the City Point Historic District, where a walking tour highlights 25 historic homes and structures dating from 1635 to 1916.  
*609 Brown Avenue (Hopewell)*

### 36 APPOMATTOX PLANTATION

Built in 1763, this plantation home is located at the junction of the James and Appomattox Rivers. It is a National Park Service site and part of Petersburg National Battlefield. Weddings and receptions may be held on the grounds.  
*1001 Pecan Avenue (Hopewell)*



### 37 GENERAL GRANT'S HEADQUARTERS

While laying siege to Petersburg during the Civil War, General Ulysses S. Grant established his headquarters at City Point, a small port town at the confluence of the James and Appomattox Rivers. Overnight, the town and adjacent Appomattox Plantation became one of the busiest ports in the world as hundreds of ships delivered food, clothing and ammunition. While running the war from City Point, General Grant received many notable political and military visitors, including President Abraham Lincoln and General William T. Sherman.  
*1001 Pecan Avenue (Hopewell)*

### 38 OLD CITY POINT WATERFRONT PARK

There is a boardwalk, benches, picnic tables, a gazebo, and restrooms. This is a popular fishing spot. It is on the James River.  
*Pecan Avenue (Hopewell)*





**CRATER PLANNING DISTRICT COMMISSION**  
CPDC



**Virginia Coastal Zone**  
MANAGEMENT PROGRAM



**NOAA**  
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION  
U.S. DEPARTMENT OF COMMERCE

This guide was funded in part by the Virginia Coastal Zone Management Program at the Department of Environmental Quality through Grant #NA14NOS4190141 of the U.S. Department of Commerce, National Oceanic and Atmospheric Administration, under the Coastal Zone Management Act of 1972, as amended.

**For more information, please visit these websites:**



**FOLAR**  
FRIENDS OF THE LOWER APPOMATTOX RIVER

**Friends of the Lower Appomattox River:**  
[www.folar-va.org](http://www.folar-va.org)

**FOLAR is a non-profit organization dedicated to promoting and enhancing the Appomattox River between the Lake Chesdin Dam and City Point in Hopewell. With the support and cooperation of the surrounding localities, FOLAR is developing a "greenway-blueway" network of hiking and water trails along this 22-mile stretch of river.**

**Petersburg Area Regional Tourism:**  
[www.petersburgarea.org](http://www.petersburgarea.org)

**Colonial Heights Appomattox River Trail System:**  
[www.colonialheightstrails.org](http://www.colonialheightstrails.org)

**Crater Planning District Commission:**  
[www.craterpdc.org](http://www.craterpdc.org)

**Willcox Watershed Conservancy:**  
[www.leeparkpetersburg.org](http://www.leeparkpetersburg.org)

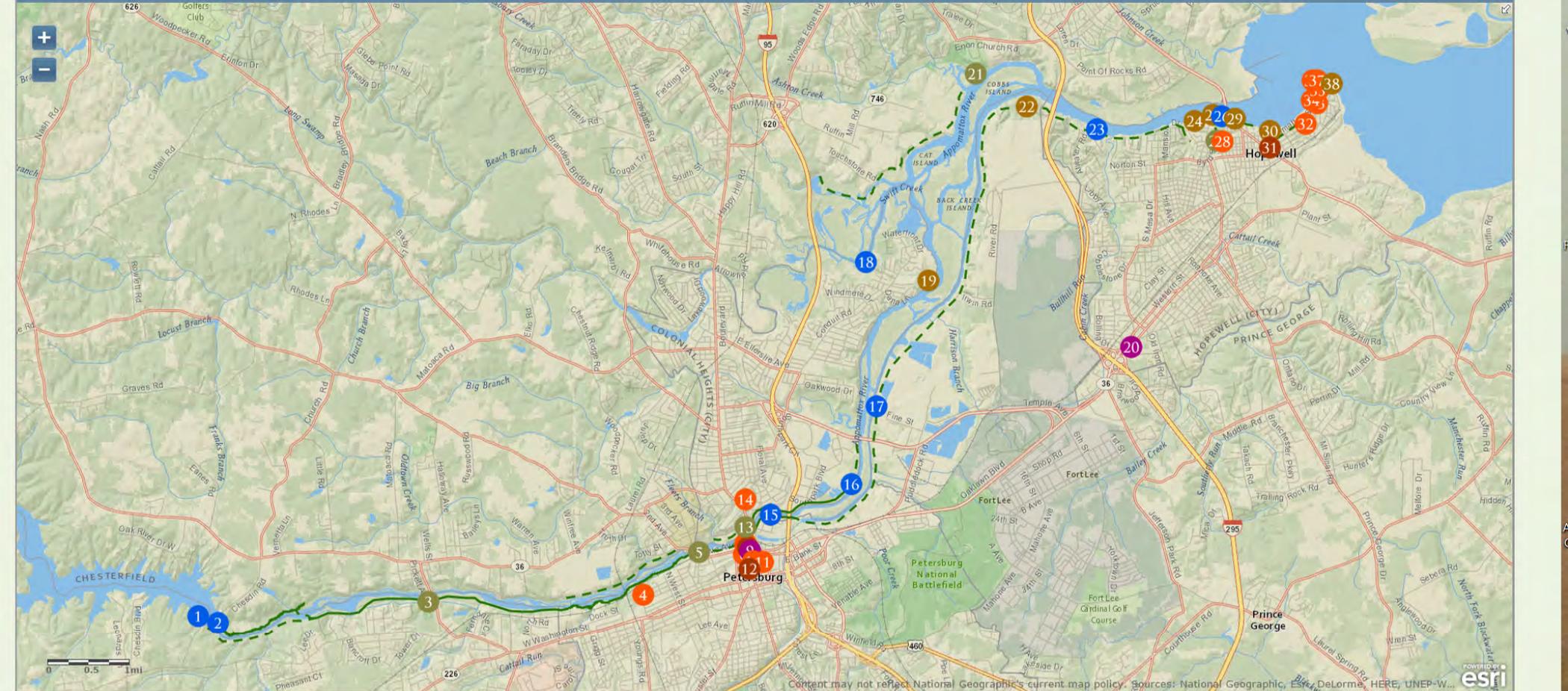
**Virginia Department of Conservation and Recreation:**  
[www.dcr.virginia.gov](http://www.dcr.virginia.gov)

**Virginia Department of Game and Inland Fisheries:**  
[www.dgif.virginia.gov](http://www.dgif.virginia.gov)

**Online Mapping Application:**  
[www.craterpdc.org/webmaps/arig](http://www.craterpdc.org/webmaps/arig)



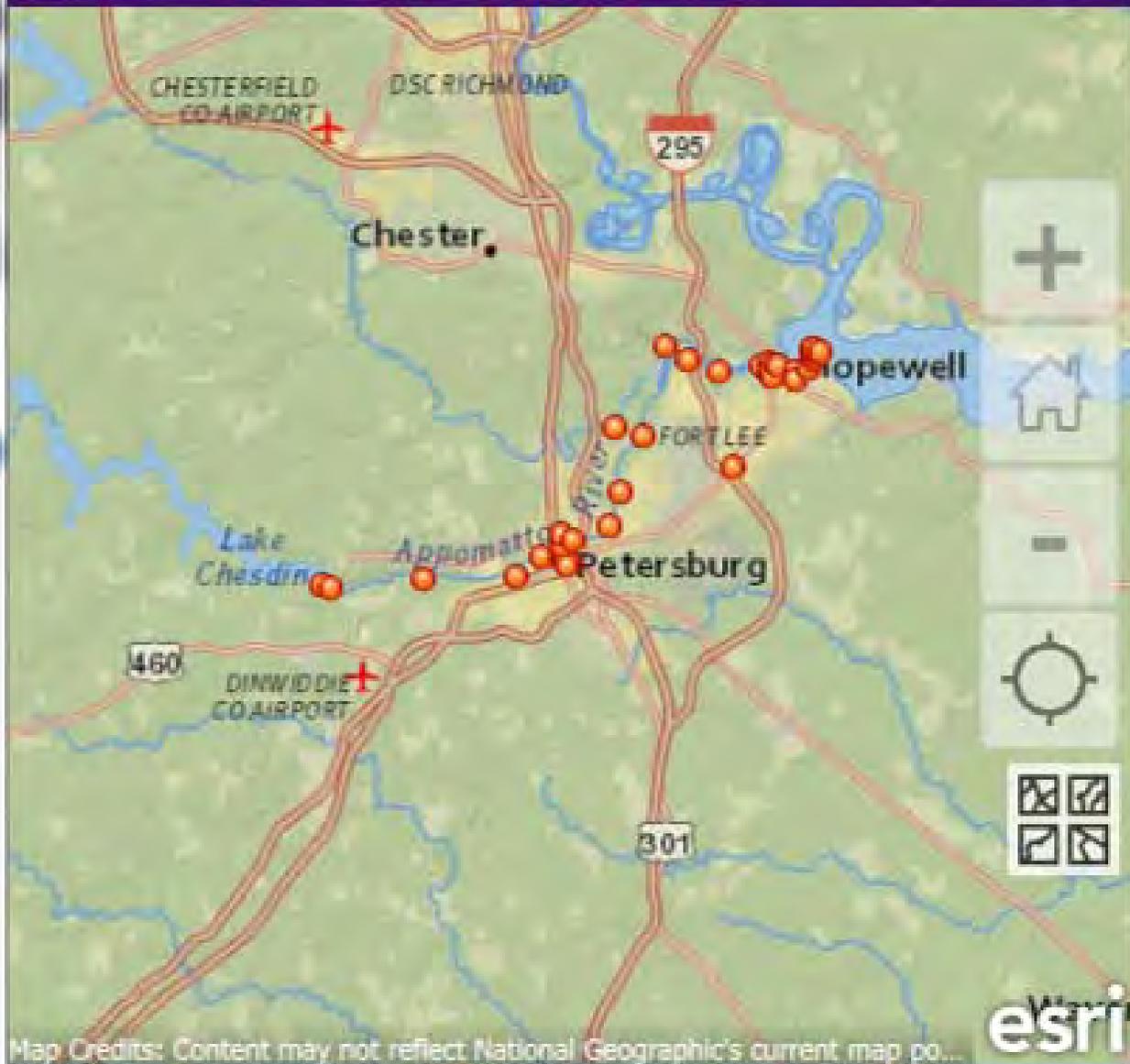
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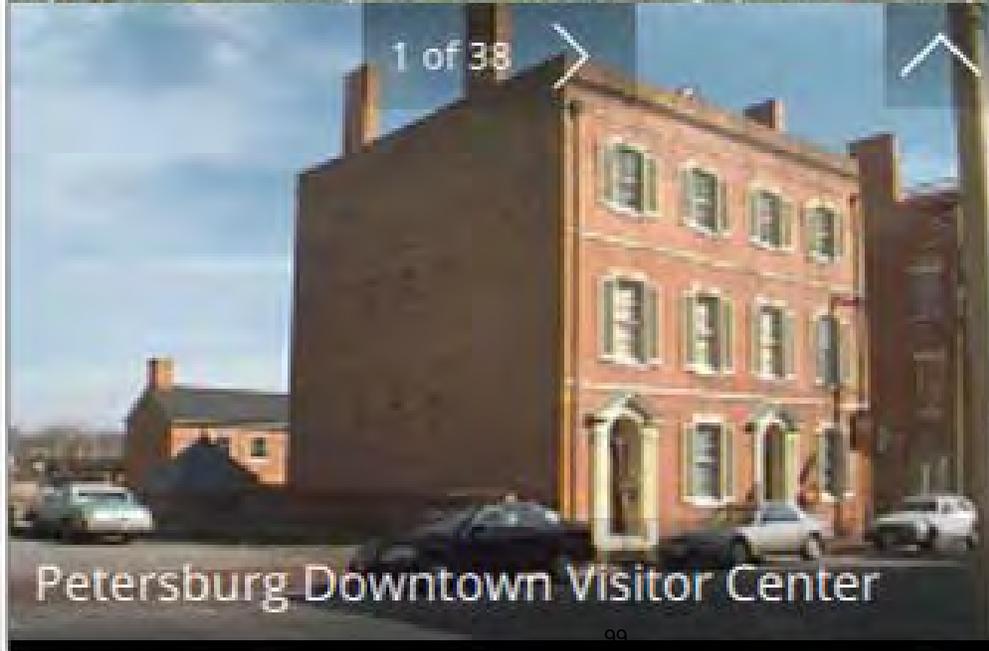


List

Map



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Petersburg Downtown Visitor Center



Lake Chesdin

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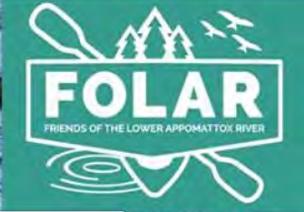
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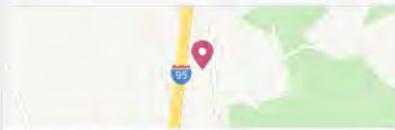
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ABOUT



Ask for FOLAR - Friends of the Lower Appomattox River's address

(804) 861-1666

<http://folar-va.org/>

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Hopewell Cogeneration cleans up at City Park in Hopewell.




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## ARRP Clean Up & Repair – November 24, 2014



FOLAR (Legacy Site) x Richmond duo to capture James River using 'Google Car' raft

wtvr.com/2014/07/14/richmondgrid-photohontas-james-river/

NEWS TRAFFIC HEALTH HEROES COMMUNITY EVENTS ON-AIR CONTESTS WEATHER 56° THE MEADOW EVENT PARK

# Richmond duo to capture James River using 'Google Car' raft

POSTED 7:40 AM, JULY 14, 2014, BY GREATER RICHMOND GRID, UPDATED AT 07:42AM, JULY 14, 2014

FACEBOOK 642 TWITTER 53 EMAIL GOOGLE PINTEREST 1 REDDIT

RICHMOND, Va. – Envision yourself on the river, the James River. Envision yourself on a rock in the middle of the river with water flowing by. Now turn 360 degrees in place and take in the vistas that surround you.

This summer, two Richmond-based entrepreneurs are teaming up to make their vision of the James a reality, a reality possible from any device with access to the Internet.



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## Riverfest Preparation – April 6, 2015



**4/25/15**  
 LOWER APPOMATTOX  
**RIVERFEST**  
 AT APPOMATTOX RIVERSIDE PARK  
 FOLAR  
 FRIENDS OF THE LOWER APPOMATTOX RIVER

*Saturday, April 25th from 9:00am - 3:00pm*  
 A COMMUNITY PROJECT OF THE FRIENDS OF THE LOWER APPOMATTOX RIVER (FOLAR)

THE LOWER APPOMATTOX RIVERFEST IS A FUN-FILLED DAY OF OUTDOOR ACTIVITIES INCLUDING:

- \*FISHING LESSONS FOR 8 - 12 YEAR OLDS
- \*CANOEING AND KAYAKING FOR FIRST TIMERS
- \*BATTEAU RIDES
- \*AN EXPEDITION POINTING OUT RARE FAUNA ALONG THE TRAILS
- \*SEE AND LEARN ABOUT RIVER FISH, REPTILES, AMPHIBIANS, AND BUGS
- \*ENJOY CRAFTERS, MUSICIANS, AND FOOD - OR BRING A PICNIC!!!!

ADDITIONAL EVENT PROGRAM CONTRIBUTORS INCLUDE: DEPARTMENT OF FORESTRY, NATIONAL PARK SERVICE, VIRGINIA AMERICAN WATER, APPOMATTOX RIVER, SOIL AND WATER CONSERVATION DISTRICT, VIRGINIA STATE UNIVERSITY, 4-H, AND MORE!!!

THANK YOU TO DINWIDDIE AND PETERSBURG PARKS AND RECREATION DEPARTMENTS FOR THEIR SUPPORT OF THIS EVENT.

THE LOWER APPOMATTOX RIVERFEST IS FREE AND OPEN TO THE PUBLIC. SOME ACTIVITIES DO REQUIRE PRE-REGISTRATION.

**ABOUT FOLAR**

THE 20th LOWER APPOMATTOX RIVERFEST IS BROUGHT TO YOU BY THE FRIENDS OF THE LOWER APPOMATTOX RIVER (FOLAR), THE ONLY ORGANIZATION IN THE REGION DEDICATED TO CONSERVING AND PROTECTING THE NATURAL, CULTURAL, AND RECREATIONAL RESOURCES ALONG THE LOWER APPOMATTOX RIVER. FOLAR HAS SERVED THE REGION AS A REGISTERED 501(C)3 NONPROFIT ORGANIZATION SINCE 2006. PROCEEDS FROM THIS EVENT WILL HELP FOLAR AS WE WORK TO IMPROVE PARKS, ESTABLISH TRAILS, ACCESS THE RIVER, AND PROTECT SPECIAL PLACES THROUGH OUR RIVER STEWARDSHIP-EDUCATION PROGRAMS, WATER QUALITY PROGRAMS AND THE GREENWAY/BLUEWAY HERITAGE TRAIL.

Contact FOLAR at [www.folar-va.org](http://www.folar-va.org) / Email: [GetInvolved@folar-va.org](mailto:GetInvolved@folar-va.org) / Phone: (804) 861-1666

## GUIDE TO FOLAR RIVERFEST 2015 ACTIVITIES!



### Workshops/Activities

- YOUTH FISHING WORKSHOPS.** 9AM and 11AM at the PIER. Sponsored by DGIF and WFVA.
- MACROINVERTEBRATES EXPEDITIONS.** 10AM and 12Noon. Meet at the BRIDGE. With Chesterfield County Environmental Engineering, Outreach Coordinator
- PADDLE WORKSHOPS.** 10:30AM and 1:30PM at the CANAL RAMP. With Eco Trek Certified Instructors
- FOLAR CANAL TRAIL CART RIDES.** 9:15AM, every 40 minutes. Start at the BRIDGE.
- BATTEAU RIDES on the Canal.** 12 noon, every 40 minutes at the PIER. With VC&NS, Captain Ned Nelson.
- WALK THE TRAILS.** Open for hiking all day with beautiful views.
- BOWLD SOJER Band.** 12 noon and 1:30. - Music from the 19th century, including traditional fiddle tunes.

FOLAR thanks our sponsors!



VIRGINIA IS FOR LOVERS

### Exhibitors 9AM - 3PM (Alphabetical)

- Appomattox River Soil and Water Conservation District - Soil Tunnel
  - Blacksmith, Grizzly Forge - Demonstration
  - Chesterfield County - Planning Department; Parks & Recreation; Environmental Engineering - Bikeways and Trails Plan; East Coast Greenway; Parks & Rec Outdoor Programs
  - Columbia Gas of Virginia - Natural Gas and Digging Safety
  - Dinwiddie Master Gardener - Native Plants and Gardening
  - Dinwiddie 4-H and Parks & Recreation Department - Animal Tracks Activity
  - FOLAR - Friends of the Lower Appomattox River - Appomattox River Greenway-Blueway
  - Eco Trek Adventures - Kayaking and Canoeing
  - Hopewell City Parks & Recreation - Fitness Fun
  - Matoaca Village History - Artifacts/Exhibit
  - National Park Service, Petersburg Battlefield/City Point - History/Parks/Activity
  - Petersburg Museums - History Information
  - Sam's Club - Drinks & Snacks
  - Virginia American Water - We drink what? Watershed Model Demo
  - VCU Rice Rivers Center - Atlantic Sturgeon Display - River Ecosystem Science
  - Virginia Canal & Navigation Society - History of Batteaus and Canals in Va.
  - Virginia Department of Game and Inland Fisheries - Snakes Alive!; Snake Rubbings
  - Virginia Department of Forestry - Prevent Forest Fires/Tree Seedlings
  - Va. State University 4-H - Catfish Live!; What's in your water? Microscope/Water Testing
  - FOOD VENDORS -** Hau Lani Shave Ice Cream, Lemonade Slushee and soft drinks; Woodhead's Grill, Barbecue and Grill Sandwiches
- Special thanks to Dinwiddie and Petersburg Parks & Recreation Departments

Benefiting the Friends of the Lower Appomattox River (FOLAR) conservation programs.

Friends of the Lower Appomattox River 804-861-1666 [ContactUs@folar-va.org](mailto:ContactUs@folar-va.org) [www.FOLAR-VA.org](http://www.FOLAR-VA.org)

MARK YOUR CALENDAR: 8<sup>TH</sup> ANNUAL FOLAR BATTLE or PADDLE 10 MILE RIVER RACE, SEPTEMBER 26, 2015



## Riverfest – April 25, 2015



W FOLAR Hosts Lower Ap...

www.prweb.com/releases/2015/FOLAR/05Riverfest/prweb12690129.htm

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Tuesday, November 10, 2015

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Contact Author

WENDY AUSTIN  
FOLAR ID: #1 (804) 549-0225  
Email =

VISIT WEBSITE

Media

A representative from the Virginia State University 4-H Program shares information on water quality testing and river health.

Joining all conservation and native plant demonstrations were enjoyed by RiverFest participants.

A group of youth and watchful parents enjoy the Youth Fishing Workshop.

The Virginia Canal & Navigation Society provided a static demonstration of batteau navigation and functionality.

**FOLAR Hosts Lower Apomattox RiverFest at Appomattox Riverside Park near Petersburg**

Despite the rainy weather, Friends of the Lower Apomattox River (FOLAR) hosted a family fun and adventure event on the river April 25. The event, which celebrated the heritage, nature, and recreational offerings of the Lower Apomattox River, was held at the historic Fendalle-Appomattox Riverside Park in Dinwiddie County near Petersburg, VA.

**PETERSBURG, VA (PRWEB) APRIL 30, 2015**

Despite the rainy weather, Friends of the Lower Apomattox River (FOLAR) hosted a family fun and adventure event on the river April 25. The event, which celebrated the heritage, nature, and recreational offerings of the Lower Apomattox River, was held at the historic Fendalle-Appomattox Riverside Park in Dinwiddie County near Petersburg, VA.

Featured activities offered throughout the day included trail hikes, youth fishing workshops, kayak and canoe paddling lessons and a batteau exhibition. Batteaux were flat-bottomed, shallow draft boats used in Colonial times, especially in the Fur trade.

Visitors also enjoyed the many organizations present who shared information and expertise on a wide range of topics such as watershed protection, gardening, aquaculture, wildlife enjoyment, soil management, blacksmithing, local history, fitness, forest fire prevention and local parks and tourism.

As one event participant commented, "We had the best time and everyone was wonderful while teaching and patiently helping the children learn great things about our rivers and their inhabitants."

The event was a community effort to bring together several highly respected regional organizations and experts to provide high quality, informative and entertaining programming in a beautiful natural setting. Wayne Walton, FOLAR's Chairman, said "This was a great example of the positive momentum that is building in the region and we truly appreciate the many supporters and participants who made this event a success. FOLAR is truly a regional success story."

FOLAR has a lot of experience in bringing the together the Lower Apomattox River communities to deliver successful, cooperative projects. During the past 13 years, FOLAR has been developing and maintaining the Regional Greenway/Blueway Heritage Trail along the Lower Apomattox River. The trail system is 22 miles long with seven boat access points, 12 miles of walkable riverside trails and 11 riverside parks - all of which FOLAR created, improved or maintains through its network of volunteers and donors.

Sponsors and donors were key to the success of RiverFest, including Walmart, Virginia American Water, Rock-Tenn, Columbia Gas of VA, Vulcan Materials, and the Apomattox River Soil & Water Conservation District. Additional funding for promotion of the event was provided by a Virginia Tourism Corporation Marketing Leverage Reimbursement (PIL) Agreement with Petersburg Area Regional Tourism (PART) and Eco Trek Adventures-River Tours & Rentals to match the state event funds. All

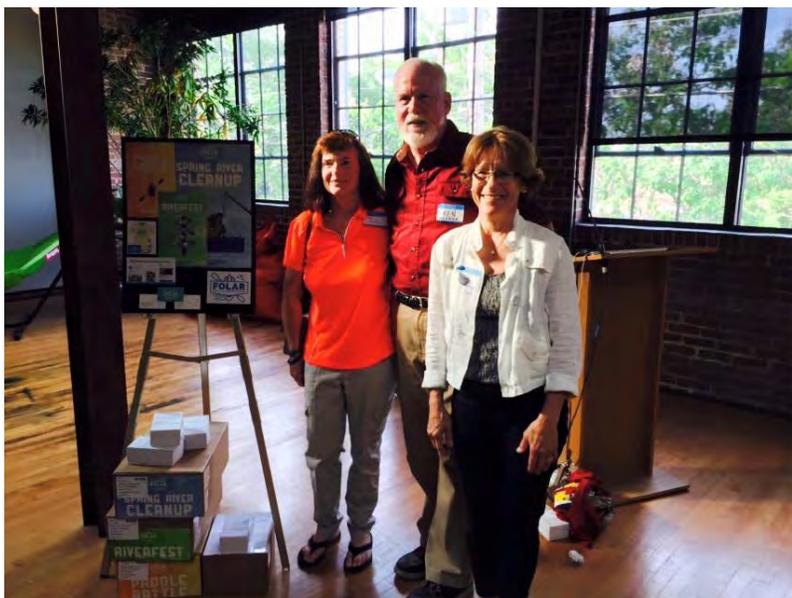
Wendy Austin rolls out the "welcome" sign at FOLAR RiverFest.

This was a great example of the positive momentum that is building in the region and we truly appreciate the many supporters and participants who made this event a success.



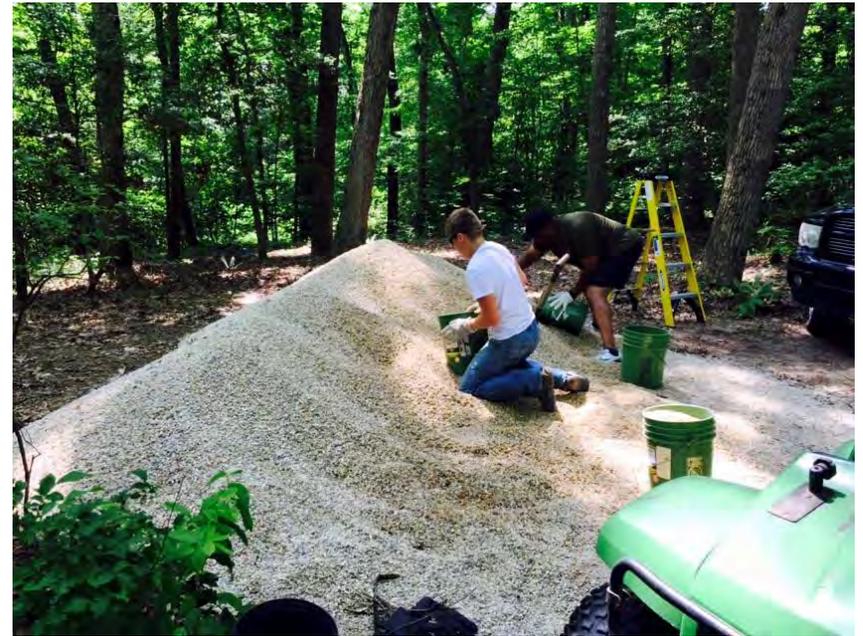
## Hopewell City Park Clean Up – May 2, 2015





## CreateAthon– May 7 2015





## ARRP Improvements & New Bench – May 16, 2015





**Woodmen of the World Environmental Award – May 27, 2015**



## Week of Wonder in Hopewell Riverside Park – June 22, 2015



FOLAR - Friends of t... FOLAR is 'People's C...

www.progress-index.com/article/20150810/NEWS/150819990/13360/NEWS

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## FOLAR is 'People's Choice' in 'Butts to Broadway' barbecue competition

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By Contributed Report  
Posted Aug. 10, 2015 at 2:01 AM

HOPEWELL — The Friends of the Lower Appomattox River (FOLAR) competed in the recent Hopewell Downtown Partnership's "Get Your Butts to Broadway" barbecue competition. The team was led by FOLAR's newest board member, Johnny Partin, 22, and two chefs: Steve Rasnick and Trip Wilson, all three residents of Hopewell.

The environmental nonprofit team started at 5:45 a.m. with set up and began going through its health inspection. After cooking roughly 150 pounds of pork butt barbecue for 10 hours, FOLAR was ready to conduct one of its most successful fundraisers and outreach events of the year. At the closing of the event, FOLAR netted almost \$650: \$252 in food sales, \$230 in donations, and \$160 in memberships and apparel items.

The money that was raised will allow FOLAR to aggressively continue to improve the environmental quality of the lower Appomattox River, while increasing eco-economic development.

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