



GWRC Coastal Technical Assistance Program Report, FY2014



GEORGE WASHINGTON
REGIONAL COMMISSION

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This project was funded, in part, by the Virginia Coastal Zone Management Program at the Virginia 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.

Product #1: Training and Coordination Summary

Description: Consolidation of meeting minutes and program recommendations, and training materials from periodic training sessions.

Training & Coordination Events:

A. Regional Stormwater Managers Committee Meetings

These regularly scheduled meetings helped define the direction of consultant and regional staff efforts to continue to develop useful regional initiatives that help define local stormwater programs and assist local governments to comply with State stormwater management regulations. Among other topics, GWRC and the local governments spent considerable time examining the many facets of trying to implement a regional nutrient trading program. The meetings also provided opportunities to coordinate with all localities in developing the database and GIS layers of infiltrative soils for all Chesapeake Bay localities in the Commonwealth.

B. Training Events

- 1 Rappahannock River Basin Commission/GWRC Summit held September 23, 2015

C. Other Coordination Activities

GWRC staff and their consultants participated in the following CZM-related meetings.

- 1 Held a Nutrient Trading Simulation exercise for local government staff, soil & water conservation district staff, and private sector interests. October 18, 2014 at GWRC.
- 2 CZM Program Meeting – March 10, 2015.
- 3 VAPDC Annual Meeting – August 5-7, 2015.

Product #2: Enhancement of Caroline County BMP Assessment, Tracking and Monitoring System

Description: Continued Enhancement of Caroline County BMP Assessment, Tracking and Monitoring System – GWRC continued to work with Caroline County staff to further refine the BMP geodatabase that was developed in conjunction with the University of Mary Washington in FY2013. This work included further examination of the existing data structure and attribute tables as they are used by County staff to ensure that the information provided in FY2013 is useful and accurate, and serves the intended purpose as was originally determined in the scope of work. GWRC worked with County staff to identify where information was vague or needed further refinement, and also examined the original

attribute tables to insure that these were adequate in the breadth and scope of information to be useful to all County departments that will be using this information.

Report Components:

A. Regional CZM Technical Assistance Program Summary

Infiltrative Soils Data Consolidation Initiative – Infiltrative soils have particular importance for groundwater recharge and for use by Low-Impact Development infiltration practices. Many localities in the Chesapeake Bay Watershed have identified these soils for protection within their codes, ordinances and comprehensive plans. Identifying and mapping these particular soils into a readily accessible Geodatabase file would be highly beneficial for plan reviewers as they determine what areas should be protected in overall development plans or that should be incorporated into stormwater management plans. Preserving, or utilizing, infiltrative soils to support groundwater recharge is an important aspect of maintaining both regional hydrology as well as groundwater resources. In addition, promoting the use of infiltrative stormwater management techniques will significantly reduce nutrient runoff to local streams and rivers and help local jurisdictions meet their Chesapeake Bay Phase II WIP goals and objectives.

In early October, GWRC staff met with Mary Washington University (MWU) staff to discuss the employment of one or more interns to assist GWRC in developing the A/B infiltrative soil map for Caroline County. After discussing the project with MWU staff, a job notice was posted within the Geography department. GWRC hired an intern in October 2014 and work began in assembling the National Resources Conservation Services (NRCS) of the U.S. Department of Agriculture soils data.

The project team found that the soils databases are quite complicated and consist of over 40 separate tables, with applicable data spread throughout many of these tables. Once the appropriate tables were identified, staff assisted the intern in developing the appropriate attributes to identify the A/B soils. A more detailed explanation of this work can be found within the attached metadata description.

Once the database issues had been resolved, the work in compiling Caroline County's A/B soils moved along smoothly. As such, the project team decided to expand the project and to create similar datasets for every Virginia locality within the Chesapeake Bay watershed that had relevant NRCS data. GWRC collected and assimilated A/B soils data for 38 localities. Four localities had incomplete soils data.

B. Subsequent Deliverables

- 1 Access database with embedded object hyperlinks to catalog of scanned BMP maintenance agreements, site plans, field reports, remedial BMP action plans and summary report on issues or additional needs for county use was produced.**

Product #3: Rappahannock River Basin Summit

Description: GWRC co-sponsored a basin-wide Summit for elected officials, professionals and private sector interests to examine a wide variety of stormwater issues that affect the health and vitality of the Rappahannock River. This daylong Summit explored a variety of issues and topics and provided a forum for state delegates, local elected officials and professionals at the state and local levels.

A. Project Summary:

Working through the GWRC Stormwater Managers Technical Committee, GWRC, local and Rappahannock River Basin Commission (RRBC) staff, with stakeholder input, developed a robust agenda for the Rappahannock River Basin Summit. The objective of the Summit was to bring forth a better understanding of the complexities, issues and challenges that face the public and private sector in addressing stormwater runoff in the Basin, and to explore how the current mechanisms of the state's stormwater programs do and do not operate smoothly. As such, the following presentations and speakers were organized for the daylong program.

A Perspective on ChesBay Wellness, Where We Are and Where We Should be Headed

Delegate Ed Scott, Chair House Committee on Agriculture, Chesapeake and Natural Resources

The Current Gaps in Meeting ChesBay TMDL Obligations

Peggy Sanner, Virginia Assistant Director & Senior Attorney, Chesapeake Bay Foundation

The Nitrogen Cascade & UVA's Nitrogen Footprint Reduction Goals

Laura Cattell Noll, University of Virginia, Department of Environmental Science

Healthy Watersheds Forest/TMDL Project, Preliminary Findings and Next Steps

Senator Emmett Hanger, Virginia's 24th Senate District

Bettina Ring, State Forester of Virginia

Joe Grzeika, King George County Board of Supervisors

Greg Evans, Virginia Department of Forestry

Eldon James, RRBC Staff

Adding Wellness to Diet-based Chesapeake Bay Best Management Practices

Michael Collins, Center for Natural Capital and SoilKeepers

Simulation – Is Nutrient Trading Really Workable?

Facilitated by Michael Collins, Executive Director, Center for Natural Capital and Members of the GWRC/RRBC Technical Committees

Keynote: A Contrast - North Carolina's Approach to Stormwater Management and the State-Local Relationship

Mike Randall, North Carolina Department of Environment and Natural Resources, Division of Water Quality, Stormwater Permitting Unit

Chesapeake Bay Accountability Act

Congressman Rob Wittman, Virginia's 1st District

DEQ's Stormwater Stakeholder Advisory Group, Rewriting Virginia's Erosion and Sediment Control, Stormwater Management and Chesapeake Bay Preservation Act Statutes
Melanie Davenport, Director, Water Division, DEQ

The Summit attracted over 75 participants and concluded with the recommendation that the GWRC/RRBC Technical Committees continue to discuss and develop recommendations for how to improve the coordination and implementation of stormwater programs within the Rappahannock Basin. It was noted to, that many of these issues not only affect those localities within the Rappahannock, but really have similar impacts statewide.

Product #4: Development of an Infiltrative Soils GIS Layer for Caroline County

Infiltrative Soils Data Consolidation Initiative – Infiltrative soils have particular importance for groundwater recharge and for use by Low-Impact Development infiltration practices. Many localities in the Chesapeake Bay Watershed have identified these soils for protection within their codes, ordinances and comprehensive plans. Identifying and mapping these particular soils into a readily accessible Geodatabase file would be highly beneficial for plan reviewers as they determine what areas should be protected in overall development plans or that should be incorporated into stormwater management plans. Preserving, or utilizing, infiltrative soils to support groundwater recharge is an important aspect of maintaining both regional hydrology as well as groundwater resources. In addition, promoting the use of infiltrative stormwater management techniques will significantly reduce nutrient runoff to local streams and rivers and help local jurisdictions meet their Chesapeake Bay Phase II WIP goals and objectives.

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Once the database issues had been resolved, the work in compiling Caroline County's A/B soils moved along smoothly. As such, the project team decided to expand the project and to create similar datasets for every Virginia locality within the Chesapeake Bay watershed that had relevant NRCS data. GWRC collected and assimilated A/B soils data for 38 localities. Four localities had incomplete soils data.

A. Subsequent Deliverables

- 1 **38 Microsoft Access Database of A/B Soils attribute data for Virginia localities located within the Chesapeake Bay Watershed**
- 2 **38 separate GIS shapefiles identifying the A/B soils in Virginia localities located within the Chesapeake Bay Watershed**

Product #5: Benefits Accrued From Prior Grants

1. **Training and Coordination** –As a result of several years of coordination between regional jurisdiction stormwater staff the regional stormwater effort has made significant strides. Even though the jurisdictions may not always agree on solutions the dialogue continues to be beneficial. This cooperation has been beneficial in securing environmental funding benefits the entire region rather than one or two jurisdictions competing for similar funding and going off in different directions.
2. **Enhancement of Caroline County BMP assessment, Tracking and Monitoring System** – Caroline County has been the recipient of this funding for several years. The County which is rural in nature is quite restrained in staffing capabilities. This funding has assisted the county in bring their GIS capabilities forward to allow for more efficient and economical use of resources as it relates to development issues and opportunities that may arise in the future.

Attachment 1.A: GWRC Stormwater Managers Committee Meeting Summaries

A. Attendance Record

GWRC Stormwater Managers Committee Meeting Attendance Summary - CZM FY2013

Committee Members	10/9/14	12/11/14	2/12/15	4/9/15	5/7/15	6/18/15	8/18/15	9/9/15	Total
Caroline County									
Dave Nunnally		1		1		1	1		4
King George County									0
Jack Green									0
Heather Straughan - Hall				1	1				2
City of Fredericksburg									0
Kevin Utt		1	1	1		1			4
Spotsylvania County									0
Troy Tignor	1	1		1	1	1	1		6
Craig Pennington			1						1
Richard Street									0
John Euson									0
Rick Roberson									0
Stafford County									0
Steve Hubble			1	1					2
Paul Santay			1		1			1	3
Rishi Baral									0
Town of Bowling Green									0
Steve Manster							1		1
Town of Port Royal									0
Nancy Long									0
Alex Long									0
GWRC									0
Tim Ware	1	1	1	1	1	1		1	7
Friends of the Rappahannock									0
Kathy Harrigan						1			1
Northern Virginia Conservation Trust									0
Patrick Coady	1	1	1	1		1	1	1	7
Ryan Stewart							1	1	2
Hanover – Caroline SWCD									0
Peggy Stevens									0
Sharon Conner									0
Tri-County SWCD									0
Charles Lively									0
Virginia DEQ									0
Mike Lee									0
May Sligh						1			1
Virginia Department Forestry									0
Greg Evans				1		1		1	3
Other Participants									0
Eldon James - Eldon James & Assoc.	1	1				1	1	1	5
Doug Pickford - Conservation Concepts	1	1	1	1		1	1	1	7
Ross Pickford - Conservation Concepts	1	1	1	1	1	1	1	1	8
Kevin Byrnes, Regional Decision Systems			1	1	1	1		1	5
Chris Pomeroy - AquaLaw, Inc.									0
Mike Collins - Center for Natural Capital	1		1				1		3
Total	7	8	10	11	6	12	9	9	72

B. GWRC Stormwater Managers Committee Meeting Topics

10/9/14

1. Accounting for Local Govt In-Kind Match of DCR VSMP Grant Please bring breakdown of staff time effort for September – Tim Ware
2. October 30th Nutrient Trading Educational Workshop Update
3. Nutrient Trading Program Proposal Update
4. Legislative Update
5. FY14 Coastal Zone Management Program Update
6. Update on WIP II and VSMP Implementation – Local Governments
7. Other Business
Information Item – Regenerative Stormwater Conveyance – Troy Tignor

12/11/14

1. Accounting for Local Govt In-Kind Match of CZM Grant Please bring breakdown of staff time effort for Sept - November – Tim Ware
2. October Nutrient Trading Simulation Workshop Debrief and RRBC Technical Committee Summary
3. Nutrient Trading Demand and Supply Analysis Proposal
4. Update on VSMP Implementation – Local Governments

2/12/15

1. Accounting for Local Govt In-Kind Match of CZM Grant Please bring breakdown of staff time effort for December - January – Tim Ware
2. GWRC Proposal for DEQ RFA for Historic Urban BMP Data and Land Use File
3. Follow Up on October Workshops and RRBC Technical Committee
4. NFWF Technical Grant on Nutrient Trading Supply/Demand Study Proposal
5. Discussion of GWRC Roundtable Discussion and Update on VSMP Implementation

4/9/15

1. Accounting for Local Govt In-Kind Match of CZM Grant Please bring breakdown of staff time effort for January - April – Tim Ware
2. Forestland Retention Study – Greg Evans, Department of Forestry
3. GWRC Open Space Plan Revisit – Pat Coady
4. NFWF Technical Grant Deadline for Stewardship and Conservation Proposals

5. Discussion of GWRC Roundtable

5/7/15

1. Accounting for Local Govt In-Kind Match of CZM Grant Please bring breakdown of staff time effort for April – Tim Ware
2. Forestland Retention Study Proposal
3. GWRC Open Space Plan NFWF Proposal
4. Discussion of GWRC Roundtable

6/18/15

1. Accounting for Local Govt In-Kind Match of CZM Grant Please bring breakdown of staff time effort for May – Tim Ware
2. Forestland Retention Study Update
3. Center for Green Infrastructure Grant Program
4. Discussion of GWRC Roundtable with VAEPO

8/13/15

1. Accounting for Local Govt In-Kind Match of CZM Grant Please bring breakdown of staff time effort for May – Tim Ware
2. Forestland Retention Study Update and Summary of Model Runs, Next Steps – James Davis-Martin
3. NFWF Green Infrastructure Proposal Submittal – Call for Letters of Support and Briefing on Scope of Work – Tim Ware/Ross Pickford
4. Rappahannock River Basin Summit Update – Mike Collins

9/9/15

1. Accounting for Local Govt In-Kind Match of CZM Grant Please bring breakdown of staff time effort for August – Tim Ware
2. NFWF Green Infrastructure Proposal Submittal – Call for Letters of Support and Briefing on Scope of Work – Tim Ware/Ross Pickford
3. Rappahannock River Basin Summit Update – Eldon James
4. Forestland Retention Study Update, Next Steps – Greg Evans

Attachments

Attachment 1.A.1 – Coordination – GWRC Stormwater Managers Committee Meeting Summaries

GWRC Regional Stormwater Managers Committee
Thursday, 10/9/14
GWRC Conference Room
10:00 A.M.

Meeting Agenda

1. Accounting for Local Govt In-Kind Match of DCR VSMP Grant Please bring breakdown of staff time effort for September – Tim Ware
2. October 30th Nutrient Trading Educational Workshop Update
3. Nutrient Trading Program Proposal Update
4. Legislative Update
5. FY14 Coastal Zone Management Program Update
6. Update on WIP II and VSMP Implementation – Local Governments
7. Other Business
Information Item – Regenerative Stormwater Conveyance – Troy Tignor
8. Next Meeting

GWRC Regional Stormwater Managers Committee
Thursday, 10/9/14, 10:00 am
GWRC Conference Room

Meeting Summary

In attendance were: Eldon James, James & Associates; Tim Ware, GWRC; Patrick Coady, Northern Virginia Conservation Trust; Troy Tignor, Spotsylvania County; Ross and Doug Pickford, Conservation Concepts; and attending via conference call were Mike Collins, Center for Natural Capital.

October 30th Nutrient Trading Educational Workshop

Doug Pickford mentioned that he had contacted SDI Engineers and that Zeke Moore had agreed to participate in the workshop on behalf of the development community. Doug provided him with some background on the workshop and its objectives, and Mr. Moore has agreed to research some of the projects that they are currently working on to see if one or more could be used in the simulation. Subsequently, Eldon James mentioned that Mac Saphir and Chris Parrish had both agreed to participate and represent the agriculture industry as potential suppliers of nutrient credits. Eldon indicated that he was working with Mac to develop some agricultural \$ values. Ross and Doug agreed to put together some urban BMP credit scenarios as well. Mike Collins indicated that he was working with Allan Brockenbrough at VaDEQ to develop a presentation that would explain the current nutrient trading regulations and criteria to set the stage for the simulation.

The committee discussed the mechanics of how the simulation would be conducted, who would be the facilitator (Eldon) and the roles of the other participants. It was agreed that the following participants would serve in the associated roles:

- | | |
|---|-----------------------------------|
| 1. Zeke Moore (SDI Engineers) | Developer/Buyer |
| 2. Steve Hubble (Stafford County) | Local Government MS4 Buyer |
| 3. Kevin Utt (Fredericksburg) | Local Government MS4 Buyer |
| 4. David Perdue (Rappahannock Nutrient Bank) | Perpetual Nutrient Credit Seller |
| 5. Jon Roller (Rappahannock Nutrient Bank)
Agent | Perpetual Nutrient Credit Seller |
| 6. Chris Parrish (Rappahannock Farmer) | Ag. BMP Term Credit Seller |
| 7. Mac Saphir (Rappahannock Farmer) | Ag. BMP Term Credit Seller Agent |
| 8. Ross Pickford (Suburban Landowner) | Urban BMP Perpetual Credit Seller |
| 9. Michael Collins | DEQ |
| 10. Pat Coady | Insurance Agent |
| 11. Eldon James | Exchange Administrator |
| 12. Other participants | Observers |

The committee discussed what the general objectives were for the workshop and indicated that, based on the issues/concerns that arise during the simulation, that a series of recommendations would be developed for the final report specifying how to improve or enhance the current nutrient trading regulations. Lastly, Eldon mentioned that the GWRC conference room had been reserved and that he would make arrangements to have lunch delivered for the participants. Eldon also noted that the RRBC was still interested and would be pursuing to conduct a basin wide simulation in 2015 (as part of a basin wide summit).

Nutrient Trading Program Proposal Budget

Doug Pickford circulated a draft budget for the proposed Pilot Nutrient Trading Program proposal that the committee has been developing. He indicated that he needed estimates from other committee participants on their resource needs and commitments in assisting in the project once funding has been secured. He mentioned that it is anticipated that NFWF funding should be coming available in December or early 2015 and that the committee needs to finalize some of the details in the proposal.

Legislative Issues

The committee discussed whether there were any issues that they might have that need to be addressed in the upcoming General Assembly session. Eldon James indicated that there were no pre-filed bills that addressed any particular stormwater issues. He did note that Delegate Lingamfelter was working with DEQ and local government staff in developing a proposal that would seek a bond issuance aimed at funding land conservation efforts in stream corridors.

Troy Tignor mentioned that there is a looming issue associate with VDOT stormwater responsibilities as they pertain to legacy stormwater drains that extend outside of VDOT's right-of-ways/easements. Many of these pipes (he had photos of one particular situation in Spotsylvania County) are deteriorating and creating significant erosion problems for adjacent landowners. These landowners are currently approaching the county for assistance and guidance on what to do.

Other Business

Troy Tignor circulated a template letter that the National Association of Counties was asking localities to sign on to. The letter addresses issues that NACO sees with the EPA's proposed rule on "Definition of "Waters of the United States Under the Clean Water Act". T

Next meeting is not scheduled to be held in November due to the October 30th Educational forum.

With no further topics to discuss, the meeting was adjourned at 12 p.m.

GWRC Regional Stormwater Managers Committee
Thursday, 12/11/14
GWRC Conference Room
1:00 P.M.

Meeting Agenda

1. Accounting for Local Govt In-Kind Match of CZM Grant Please bring breakdown of staff time effort for Sept - November – Tim Ware
2. October Nutrient Trading Simulation Workshop Debrief and RRBC Technical Committee Summary
3. Nutrient Trading Demand and Supply Analysis Proposal
4. Update on VSMP Implementation – Local Governments
5. Other Business
6. Next Meeting

GWRC Regional Stormwater Managers Committee
Thursday, 12/11/14, 10:00 am
GWRC Conference Room

Meeting Summary

In attendance were: Eldon James, Eldon James & Associates; Tim Ware, GWRC; Patrick Coady, Northern Virginia Conservation Trust; Troy Tignor, Spotsylvania County; Ross and Doug Pickford, Conservation Concepts; Kevin Utt, City of Fredericksburg; and David Nunnally, Caroline County.

October 30th Nutrient Trading Educational Workshop Debrief

Eldon James provided a summary of the discussions that occurred during the December 2nd Rappahannock River Basin Commission meeting where the *Draft Virginia River Friendly Capital Improvements, Phase I Report* was presented. In general, he indicated that the report was well received by RRBC members. However, DEQ did point out some misinterpretations of the existing regulations, such as the suggestion that MS4 localities were prohibited from trading outside of their jurisdictional boundaries due to their MS4 nutrient reduction commitments. A couple members also felt that some of the recommendations were too critical of DEQ's regulations. Mostly though, the findings in the report were perceived to be very interesting and would require further digestion by commission members and staff as to what some of the next steps would be taken. Moreover, it is evident that if some of the professionals in the stormwater industry were confused by the current regulatory environment, then further refinement or education by DEQ was indeed needed.

Eldon indicated that the next steps for RRBC would be to meet with Russ Baxter and Allan Brockenbough (VaDEQ) to discuss the report in more detail. After that meeting, the RRBC technical committee will prioritize some of the findings and take these back to the full commission with recommendations on how to proceed. This process will occur between now and the next meeting of the RRBC in March, 2015.

Another take away from the simulation exercise was that there is significant interest in conducting additional similar exercises, with perhaps more detail, as well as developing specific recommendations as these exercises are completed.

Nutrient Trading Program Proposal Budget

Doug Pickford reminded committee member to review the nutrient trading supply and demand draft proposal and budget document that was circulated at the October meeting. He mentioned that it is anticipated that NFWF funding should be coming available in December or early 2015 and that the committee needs to finalize some of the details in the proposal.

Legislative Issues

Eldon mention that he has been asked by DEQ to serve on a technical committee that is being established to review the existing stormwater regulations. He indicated that he would like to utilize the GWRC committee as a sounding board as the DEQ committee begins its deliberations.

Other Business

Kevin Utt asked if anyone knew when the non-point to non-point nutrient trading regulatory guidance would be issued by DEQ. Eldon thought that it wouldn't be until early 2015, but that he would look into this to find out more information.

Troy Tignor wondered if anyone else had received the DEQ's stormwater permit invoicing. He is still waiting on the State to invoice for his collected stormwater permit fees.

Next meeting is scheduled for February 12, 10 a.m. at GWRC.

With no further topics to discuss, the meeting was adjourned at 3 p.m.

GWRC Regional Stormwater Managers Committee
Thursday, 2/12/15
GWRC Conference Room
10:00 A.M.

Meeting Agenda

1. Accounting for Local Govt In-Kind Match of CZM Grant Please bring breakdown of staff time effort for December - January – Tim Ware
2. GWRC Proposal for DEQ RFA for Historic Urban BMP Data and Land Use Files
3. Follow Up on October Workshops and RRBC Technical Committee
4. NFWF Technical Grant on Nutrient Trading Supply/Demand Study Proposal
5. Discussion of GWRC Roundtable Discussion and Update on VSMP Implementation
6. Other Business
7. Next Meeting

GWRC Regional Stormwater Managers Committee
Quarterly Meeting
Thursday, 2/12/14
GWRC Conference Room
10:00 am

Meeting Summary

In attendance were: Tim Ware, GWRC; Craig Pennington, Spotsylvania County; Ross and Doug Pickford, Conservation Concepts; Kevin Utt, City of Fredericksburg; Paul Santay and Steve Hubble, Stafford County; Kevin Byrnes, Regional Decision Systems and joining via conference call Patrick Coady, Northern Virginia Conservation Trust; Mike Collins, Center for Natural Capital.

GWRC Proposal for DEQ RFA for Historic Urban BMP Data and Land Use Files

The committee discussed whether there was interest to submit a regional proposal to update DEQ's inventory of local urban BMPs and the optional activities of providing updated spatial (GIS) land use data. There was considerable discussion over the template that was provided by DEQ BMP data, as well as whether DEQ would want the local land use and zoning designations or if those needed to be aggregated into some sort of regional or state classification for use in the Chesapeake Bay model. Stafford County indicated that they would seek out modest funding to conduct the BMP work themselves but would be supportive of a regional initiative to submit updated land use information. The other localities indicated similar preferences (note: subsequently King George County asked that GWRC submit a proposal on their behalf to submit the BMP information). It was agreed that all of the localities would support a regional GWRC proposal to gather and submit updated land use information and to update an existing land use analysis that had been conducted four years prior. Deadline for proposals is February 20th, and GWRC agreed to circulate a letter of support template to committee members.

Follow Up on October Workshops and RRBC Technical Committee

Mike Collins briefed the committee on the activities of the RRBC Technical Committee since presenting the *Draft Virginia River Friendly Capital Improvements, Phase I Report* to stakeholders in December. Mike mentioned that he and Eldon met shortly after the December meeting with Russ Baxter and Allan Brockenbough (VaDEQ) to discuss the report in more detail. After that meeting, Mike indicated that they were making changes to the report based on DEQ feedback and those received during the last RRBC Technical Committee. He indicated that the RRBC Technical Committee will prioritize some of the findings and take these back to the full commission with some recommendations on how to proceed. This process will occur between now and the next meeting of the RRBC in March.

Mike also mention that the RRBC Technical Committee is moving forward with plans to conduct a basin-wide Summit scheduled for September. They would be looking to GWRC Committee for advice and input on the agenda and participation in the summit.

NFWF Technical Grant on Nutrient Trading Supply/Demand Study Proposal

Conservation Concepts noted that the NFWF proposal that the group had been working on during the later part of 2014 had been submitted in January on behalf of GWRC and the local governments. The second round of NFWF Technical Grants will be due some time in April, therefore it was noted that the committee should learn whether the project will be funded prior to then. The committee was encouraged to think about potential projects for the next two rounds of NFWF Technical grant cycles.

GWRC Roundtable and Update on VSMP Implementation

One of the deliverables for GWRC's FY14 CZM program is to host or co-host a forum to address topics of concern as they pertain to water quality in the Chesapeake Bay. One thought put forth in GWRC's program was to have a half-day roundtable discussion that looked at how well VSMP Implementation was proceeding. After considerable discussion by local staff, it was the consensus that there were not so many direct issues with VSMP implementation, as there are in more detailed engineering and specific elements of stormwater implementation in general. Many of these issues arise from engineering staff (both public and private) during plan reviews, etc. The committee agreed that maybe a better approach is to begin compiling lists locally of some of these issues, consolidate the list and then come up with a half-day workshop to discuss and address these issues. As such, it was agreed that the forum should probably be held in early August and could serve as a precursor to the basin-wide summit being organized by RRBC.

Other Business

Pat Coady mentioned that he is still interested in taking a little time to revisit the regional greenway plan that GWRC completed a few years ago. As such, the committee agreed to put this topic on the next meeting agenda.

Next meeting is scheduled for April 9, 10 a.m. at GWRC.

With no further topics to discuss, the meeting was adjourned at 12 p.m.

GWRC Regional Stormwater Managers Committee
Thursday, 4/9/15
GWRC Conference Room
10:00 A.M.

Meeting Agenda

1. Accounting for Local Govt In-Kind Match of CZM Grant Please bring breakdown of staff time effort for January - April – Tim Ware
2. Forestland Retention Study – Greg Evans, Department of Forestry
3. GWRC Open Space Plan Revisit – Pat Coady
4. NFWF Technical Grant Deadline for Stewardship and Conservation Proposals
5. Discussion of GWRC Roundtable
6. Other Business
7. Next Meeting

GWRC Regional Stormwater Managers Committee
Monthly Meeting
Thursday, 4/9/15
GWRC Conference Room
10:00 am

Meeting Summary

In attendance were: Troy Tignor, Spotsylvania County; Ross and Doug Pickford, Conservation Concepts; Kevin Utt, City of Fredericksburg; Dave Nunnely, Caroline County; Steve Hubble, Stafford County; Heather Straughan, King George County; Kevin Byrnes, Regional Decision Systems; Patrick Coady, Northern Virginia Conservation Trust; Greg Evans, VA Department of Forestry.

Local Government In-Kind Match

The attending local government members were reminded to provide GWRC with an accounting of staff time associated with efforts directed toward the CZM Grant during the period from January to April, 2015.

Forestland Retention Study, VA Department of Forestry

Greg Evans made a presentation of a grant that the DOF has established to define the value associated with forest conservation. The grant is to develop a "proof of concept" model or models to determine the general impact on reducing impervious surface growth by increasing forest retention as opposed to other pervious surfaces. The grant focus will be on the Rappahannock River basin as a whole and is looking to the GWRC for inputs from the middle Rappahannock River area. Kevin Byrnes pointed out that some of this information is contained in Development Scenario Summary that was undertaken in 2011 and he passed out copies of this report. Pat Coady mentioned that the Green Infrastructure Plan of 2010 might also contain useful information for this effort. Mr. Evans mentioned that DOF was looking for a budget and work force to complete this project. The information gathering and model scenarios must be completed by June and the full project completed by September. The model scenarios need to define what is important to the localities and what incentives might be helpful.

GWRC Open Space Plan Update

Pat Coady briefed the committee on the desire of the Northern Virginia Conservation Trust (NVCT) to have the Environment, Conservation, and Open Space Plan updated. Mr. Coady presented a summary of locality goals presented in the last plan and discussed how many of these goals remain but that substantial work has been completed. The local government representatives expressed interest in updating the information in the plan. Conservation Concepts noted that this could be the basis for an upcoming NFWF Technical Grant proposal.

NFWF Technical Grant Deadline for Stewardship and Conservation Proposals

Conservation Concepts noted that the deadline for NFWF Technical Grants for Stewardship and Conservation proposals will be due sometime in July. The committee was encouraged to think about potential projects for this NFWF Technical grant cycle.

GWRC Roundtable and Update on VSMP Implementation

One of the deliverables for GWRC's FY14 CZM program is to host or co-host a forum to address topics of concern as they pertain to water quality in the Chesapeake Bay. At the February Stormwater Manages Meeting one thought put forth in GWRC's program was to have a half-day roundtable discussion that looked at how VSMP Implementation was proceeding. After considerable discussion by local staff, it was the consensus that there were not so many direct issues with VSMP implementation, as there are in more detailed engineering and specific elements of stormwater implementation in general. Many of these issues arise from engineering staff (both public and private) during plan reviews, etc. The committee agreed that maybe a better approach is to begin compiling lists locally of some of these issues, consolidate the list and then come up with a half-day workshop to discuss and address these issues. As such, it was agreed that the forum should probably be held in early August and could serve as a precursor to the basin-wide summit being organized by RRBC. This topic was again brought forth before the committee and local government staff indicated that they had be compiling lists of VSMP issues. In addition, Troy Tignor indicated that the Roundtable could be held at the Spotsylvania government building.

Next meeting is scheduled for May 7th, 10 am at GWRC.

With no further topics to discuss, the meeting was adjourned at 12 p.m.

GWRC Regional Stormwater Managers Committee
Thursday, 5/7/15
GWRC Conference Room
10:00 A.M.

Meeting Agenda

1. Accounting for Local Govt In-Kind Match of CZM Grant Please bring breakdown of staff time effort for April – Tim Ware
2. Forestland Retention Study Proposal
3. GWRC Open Space Plan NFWF Proposal
4. Discussion of GWRC Roundtable
5. Other Business
6. Next Meeting

GWRC Regional Stormwater Managers Committee
Monthly Meeting
Thursday, 5/7/15
GWRC Conference Room
10:00 am

Meeting Summary

In attendance were: Tim Ware, GWRC; Troy Tignor, Spotsylvania County; Ross and Doug Pickford, Conservation Concepts; Dave Nunnally, Caroline County; Heather Hall, King George County; Paul Santay, Stafford County; Kevin Byrnes, Regional Decision Systems.

Forestland Retention Study, VA Department of Forestry

Tim Ware indicated that the Task & Sub-task Description and Budget for GWRC's participation in the DOF Forestland Retention Study had been presented to DOF at the end of April. He presented the committee with a copy of the submission. Kevin Byrnes indicated that he had been reviewing CAST/VAST land use data projections to see what forest loss is anticipated. He also mentioned that VA is preparing to conduct 1 meter aerial photography of the state this summer that could significantly impact current land use data as well as future projections. The new imagery will provide much more accurate baseline data than the 3 meter imagery that is being used currently. Kevin also mention that the City of Fredericksburg already has the 1 meter imagery and that they would be a good "test" to run existing land use scenarios.

Kevin is also contacting the GW Region MPO to collect population and employment forecasts at the transportation analysis zone (TAZ) level, which will provide much more detailed, and hopefully congruent, growth projections that will match up more closely with the sub-watershed boundaries that the Chesapeake Bay model uses.

Local GIS staff has been contacted to determine types of land use available. There was discussion concerning the use of conservation easement data as this land can still be cleared of trees and thus would not qualify for forestland retention.

GWRC Open Space Plan Update NFWF Proposal

Due to call-in problems with the telephone, Pat Coady was unable to participate, so the discussion on the Open Space Plan Update proposal was tabled to the next Stormwater Managers Committee meeting.

GWRC Roundtable and Update on VSMP Implementation

As with the past two monthly committee meetings, the continued work on the Roundtable was discussed briefly during the meeting. Local staff indicated that they continue to compile VSMP issues. The inclusion of the (VA business group) into the Roundtable was also discussed but no decision was made.

Next meeting is unscheduled until deliverables for the Forestland Retention Study can be determined.

With no further topics to discuss, the meeting was adjourned at 12 p.m.

GWRC Regional Stormwater Managers Committee
Thursday, 6/18/15
GWRC Conference Room
10:00 A.M.

Meeting Agenda

1. Accounting for Local Govt In-Kind Match of CZM Grant Please bring breakdown of staff time effort for May – Tim Ware
2. Forestland Retention Study Update
3. Center for Green Infrastructure Grant Program
4. Discussion of GWRC Roundtable with VAEPO
5. Other Business
6. Next Meeting

**GWRC Regional Stormwater Managers Committee
Quarterly Meeting
Thursday, 6/18/14
GWRC Conference Room
10:00 am**

Meeting Summary

In attendance were: Tim Ware, GWRC; Doug Pickford, Conservation Concepts; Kevin Utt, City of Fredericksburg; David Nunnally, Caroline County; Greg Evans, Va Department of Forestry, Heather Straughan-Hall, King George County, Kevin Byrnes, Regional Decision Systems; Patrick Coady, Northern Virginia Conservation Trust; and joining via conference call Eldon James, James & Associates and Kathy Harrigan, Friends of the Rappahannock.

DEQ/DOF Forest Retention Proof of Concept Study

Kevin Byrnes briefed the Committee on progress made to date to collect and analyze the land coverage data for the Rappahannock River sub-watersheds in each respective jurisdiction. Using aerial photography, Kevin has put together GIS layers for each locality that identifies the pervious (roads, sidewalks, buildings, etc.) and impervious areas in each sub-watershed. He also has “carved” out the forested areas of all the pervious features in each locality. As such, he has put together a baseline spreadsheet that summarizes the “existing” land uses for each jurisdiction, and has done some QA/QC to see how these numbers compare with what DEQ has in their Chesapeake Bay model. The numbers are not identical, but DEQ indicated that GWRC should proceed with the analysis and these differences can be factored in later, as this is really a proof of concept exercise, more than anything.

With baselines established, then Kevin started to analyze, or develop a methodology for analyzing three future growth strategies – 1) business as usual using the assumed growth scenario that is currently in the model; 2) a moderate slow down of growth in the region; and 3) a “green footprint” strategy that attempts to preserve a certain (to be determined) percentage of existing forests in each sub-watershed.

In looking at growth forecasts for each sub-watershed, the population forecasts were collected by transportation analysis zone, which were then disaggregated to “fit” within each of the sub-watershed boundaries. This would provide the static or “business as always” growth forecast and land consumption estimates. Kevin then looked at all permitted developments in each sub-watershed, and by using average household size estimates and current zoning conditions, determined the number of housing units that would be developed within each. He is currently meeting with each of the jurisdictional staff (planning and/or zoning) to determine what the ratio of pervious to impervious surfaces would result from such development. Using Fredericksburg as a pilot, he was able to determine that his methodology was about 97% accurate in forecasting the land consumption estimates.

Over the next two weeks Kevin anticipates meeting with and discussing this methodology with local staff and to determine if the results are reflective of some of the growth projections made by the Weldon Cooper Center (the state growth forecast agency in Virginia). We will then start to look at the two other scenarios and adjust the land consumption trends/patterns accordingly. The resulting data will be test run in the Bay Model to determine if this “proof of concept” is actually a feasible approach to determine the viability of using forest retention policies as a future BMP.

Center for Green Infrastructure RFP

Doug Pickford briefed the Committee on the Center for Green Infrastructure’s (CGI) grant RFP. Essentially CGI is looking for local proposals to provide up to \$10,000 in technical assistance, with at least an 80% local match, to help local governments develop and adopt plans and policies that promote green infrastructure. CGI has about \$100,000 available and is looking to work with approximately 10 localities in the coming year. Committee members expressed varying degrees of interest in this opportunity. Pat Coady volunteered to call CGI and discuss the merits/viability of putting in a regional proposal to assist GWRC in updating the existing regional plan and facilitating in getting the regional plan adopted by the local governments (only the City of Fredericksburg has adopted the plan to date). Dave Nunnally expressed some interest in possibly developing a GI plan for their more urbanized areas in the County.

GWRC Stormwater Roundtable

It was decided by Committee members that the Rappahannock River Basin Commission’s (RRBC) watershed wide 2015 Summit should be used as the forum in which the discussion (roundtable) of the pros and cons of the VSMP should be discussed this year (among other topics, such as nutrient trading). The Committee members felt that there would be too much duplication in effort and topics to really organize a separate roundtable for this purpose, and the topics and agenda that were being put together (by many of the same people at the table for GWRC’s Stormwater Managers Committee) was more than sufficient to address the needs and concerns of local staff and the private sector in discussing the issues with the VSMP and developing strategies and recommendations to improve VSMP implementation. The basin-wide forum will be held on September 23, 2015. Topics and Activities will include:

- The Chesapeake Bay Accountability Act
- The Importance of Forestland Retention to the Chesapeake Bay TMDL
- Conduct a Nutrient Trading Simulation – Can It Really Work?
- Rewriting Virginia’s Water Quality Laws – The Recommendations of DEQ’s Stormwater Stakeholders Advisory Group
- A Lawn Conversion Case Study

Sponsors, including RRBC and GWRC include:

- the Virginia Department of Environmental Quality,
- the Virginia Department of Forestry,
- the Center for Natural Capital, and
- SoilKeepers,

The forum is scheduled to be held from 8:30 a.m. to 3:30 p.m. at the Stafford County Campus of Mary Washington University.

Other Business

Pat Coady mentioned that he had just come from a World Resources Initiative forum where they presented a newly released study "Building a Water Quality Trading Program: Options and Considerations" report that seems to be quite appropriate for GWRC's efforts to initiate a pilot nutrient trading program in the region. He also presented a Delaware River Watershed Initiative report that was funded by the William Penn Foundation. The report was quite comprehensive and includes numerous recommendations for policy implementation. He suggested that we might consider taking some Committee time to have a presentation on one or both of these reports in the future.

Next meeting is scheduled for July 29, 12 noon at GWRC.

With no further topics to discuss, the meeting was adjourned at 12 p.m.

GWRC Regional Stormwater Managers Committee
Thursday, 8/13/15
GWRC Conference Room
1:00 P.M.

Meeting Agenda

1. Accounting for Local Govt In-Kind Match of CZM Grant Please bring breakdown of staff time effort for May – Tim Ware
2. Forestland Retention Study Update and Summary of Model Runs, Next Steps – James Davis-Martin
3. NFWF Green Infrastructure Proposal Submittal – Call for Letters of Support and Briefing on Scope of Work – Tim Ware/Ross Pickford
4. Rappahannock River Basin Summit Update – Mike Collins
5. Other Business
6. Next Meeting

GWRC Stormwater Managers Technical Meeting
August 13, 2015
GWRC Conference Room
1 p.m.

Present: Tim Ware, GWRC; Eldon James, James & Associates; Pat Coady, Northern Virginia Conservation Trust; Kevin Utt, City of Fredericksburg; Ross Pickford Conservation Concepts; Kevin Byrnes, Regional Decision Services; and attending via conference call Greg Evans, Virginia Department of Forestry.

Up for discussion was the upcoming NFWF GI proposal as well as update on the status of the DOF Forest Retention Study.

Ross kicked off the meeting with a brief discussion on our conference call with NFWF about our April proposal submission. He stated that NFWF really like the proposal and it was one of the finalists, but just missed out on being selected. NFWF mentioned that they thought the proposal was a little light on local implementation of the goals established by the Green Infrastructure Plan. NFWF also stated that they hoped we would resubmit the proposal under the current grant cycle. Ross mentioned that the current grant proposal deadline was September ? and that we would be needing letters of support from our local jurisdictions as well as the SWCD. Tim stated that he would work on getting a request for letters of support out to all the jurisdictions.

Pat mentioned that he would approach his contact at Ft. AP Hill and attempt to get them to sign onto the proposal as well.

Greg gave a synopsis of where he was on the DOF study model runs. He mentioned that as the numbers looked very good, there was a lot of interest by the Chesapeake Bay Program. The EPA is reviewing the inclusion of forest land (or Green Infrastructure) retention for TMDL credit. He hoped to hear more soon. He also mentioned that he hoped to get more detailed information from each locality on which BMPs they believed would most frequently be used in the future or which BMPs the localities preferred to see used most.

Eldon mentioned that he was working on the nutrient trading “skit” for the RRBC Summit and hoped to get input from all the “players” once he had the draft completed.

GWRC Regional Stormwater Managers Committee
Wednesday, 9/9/15
GWRC Conference Room
10:00 A.M.

Meeting Agenda

1. Accounting for Local Govt In-Kind Match of CZM Grant Please bring breakdown of staff time effort for August – Tim Ware
2. NFWF Green Infrastructure Proposal Submittal – Call for Letters of Support and Briefing on Scope of Work – Tim Ware/Ross Pickford
3. Rappahannock River Basin Summit Update – Eldon James
4. Forestland Retention Study Update, Next Steps – Greg Evans
5. Other Business
6. Next Meeting

GWRC Stormwater Managers Technical Committee Meeting
September 9, 2015
GWRC Conference Room
10:00 a.m.

Present: Tim Ware, GWRC; Eldon James, James and Associates; Pat Coady, Northern Virginia Conservation Trust; Doug Pickford, Conservation Concepts; Ross Pickford, Conservation Concepts; Kevin Brynes, Regional Decisions; and Paul Santay, Stafford County. Greg Evans, Virginia Department of Forestry called in.

Up for discussion was the upcoming NFWF GI proposal as well as Phase II of the DOF study.

Pat suggested that we might want to consider front ending the involvement of the local staff and elected officials for the NFWF GI project. He also mentioned that he spoke with AP Hill and they declined participating in the NFWF GI project.

Kevin mentioned that much of what we are discussing with the NFWF GI project is projected to be included in the Phase II DOF study project.

Eldon asked everyone to register for the RRBC Summit that will be taking place on the 23rd.

Greg gave a synopsis of where he was on the DOF study submission. He had not yet received information from VA Tech on the literature review. In addition, he hadn't really received any data from the localities on their "preferred" BMPs. Most indicated that they were required to accept any of the BMPs within the State's BMP Clearinghouse. For this reason, he asked the group if they thought he should just go with the Chesapeake Bay Program BMP default scenario for the modeling run and the group concurred. He also stated that he planned to present the preliminary findings of the DOF Forest Retention study at the RRBC Summit on the 23rd.

Greg also mention, as concerns the Phase II proposal, he was looking for additional funding in order to expand upon the current work plan.

With no further business, the meeting was adjourned at 12 noon.

Attachment 2.A.1 – A/B Infiltrative Soil Attribute and GIS Shapefiles

See Digital Files

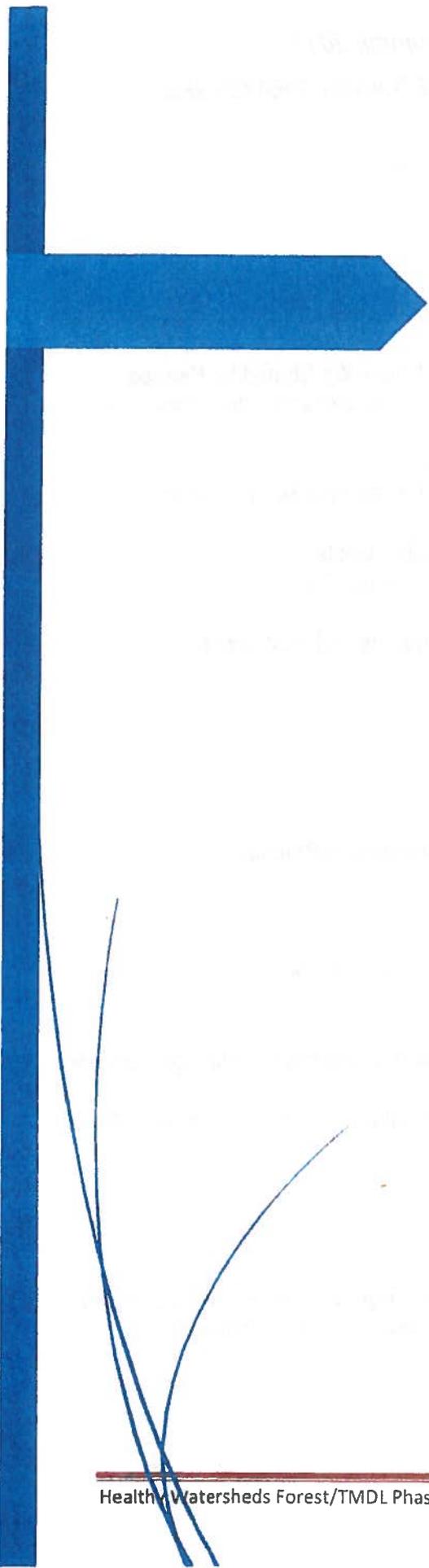
Attachment 3.1 – Rappahannock River Basin Summit Agenda, Participant List and Presentations

Rappahannock River Basin Commission Summit 2015
CHESBAY WELLNESS-EXPLORING OPPORTUNITIES AND STRATEGIES

September 23, 2015

University of Mary Washington, Stafford Campus

- 7:45 a.m. Registration**
- 8:30 a.m. Welcome and Call to Order**
Delegate Keith Hodges, Chair Rappahannock River Basin Commission, Virginia's 98th House District
- 8:40 a.m. A Perspective on ChesBay Wellness, Where We Are and Where We Should be Headed**
Delegate Ed Scott, Chair House Committee on Agriculture, Chesapeake and Natural Resources
- 9:00 a.m. The Current Gaps in Meeting ChesBay TMDL Obligations**
Peggy Sanner, Virginia Assistant Director & Senior Attorney, Chesapeake Bay Foundation
- 9:20 a.m. The Nitrogen Cascade & UVA's Nitrogen Footprint Reduction Goals**
Laura Cattell Noll, University of Virginia, Department of Environmental Science
- 9:45 a.m. Healthy Watersheds Forest/TMDL Project, Preliminary Findings and Next Steps**
Senator Emmett Hanger, Virginia's 24th Senate District
Bettina Ring, State Forester of Virginia
Joe Grzeika, King George County Board of Supervisors
Greg Evans, Virginia Department of Forestry
Eldon James, RRBC Staff
- 10:40 a.m. Adding Wellness to Diet-based Chesapeake Bay Best Management Practices**
Michael Collins, Center for Natural Capital and SoilKeepers
- 11:10 a.m. Simulation – Is Nutrient Trading Really Workable?**
Facilitated by Michael Collins, Executive Director, Center for Natural Capital and Members of the RRBC Technical Committee
- 12:30 p.m. Lunch and Keynote: A Contrast - North Carolina's Approach to Stormwater Management and the State-Local Relationship**
Mike Randall, North Carolina Department of Environment and Natural Resources, Division of Water Quality, Stormwater Permitting Unit
- 2:00 p.m. Chesapeake Bay Accountability Act**
Congressman Rob Wittman, Virginia's 1st District
- 2:30 p.m. DEQ's Stormwater Stakeholder Advisory Group, Rewriting Virginia's Erosion and Sediment Control, Stormwater Management and Chesapeake Bay Preservation Act Statutes**
Melanie Davenport, Director, Water Division, DEQ
- 3:30 p.m. Wrap Up and Adjournment**
Delegate Keith Hodges, Chair Rappahannock River Basin Commission



HEALTHY WATERSHEDS FORESTRY TMDL FOREST RETENTION STUDY:

**METHODOLOGY, FINDINGS AND
RECOMMENDATIONS**

PHASE I STATUS REPORT

SEPTEMBER 23, 2015

**To Access The Report Go To:
www.RappRiverBasin.org**

PROJECT TEAM

VIRGINIA DEPARTMENT OF FORESTRY, VIRGINIA DEPARTMENT OF ENVIRONMENTAL QUALITY, RAPPAHANNOCK RIVER BASIN COMMISSION, GEORGE WASHINGTON REGIONAL COMMISSION, VIRGINIA WATER RESOURCES RESEARCH CENTER AT VIRGINIA TECH, THE NATURE CONSERVANCY, AND THE CHESAPEAKE BAY COMMISSION

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Delegate Keith Hodges

Keith Hodges was born in Richmond, Virginia and raised on the Middle Peninsula. He received a B.S. degree from the Medical College of Virginia School of Pharmacy in 1989. He currently operates the Gloucester Pharmacy. He was elected to the Virginia House of Delegates in 2011. He represents the 98th district, made up of the Middle Peninsula counties of Essex, Gloucester, King and Queen, Mathews and Middlesex, and part of King William County.

He is a member of the Urbanna United Methodist Church, the National Community Pharmacists Association, the Virginia Pharmacists Association, the Riverside Walter Reed Hospital Board of Directors and EPIC Pharmacies Board of Directors)

Hodges married Shelley Gaye Williams in 1990. They have two daughters, Chloe and Ella.

Delegate Ed Scott

Delegate Ed Scott is a citizen-legislator in the traditional Virginia mold. A native of Culpeper and a graduate of Virginia Tech, Ed represents Madison, Orange and most of Culpeper in the Virginia House of Delegates and is a partner in EcoSeptix Alliance, a small business focused on the operation and maintenance of septic systems.

In his sixth and final term, Delegate Scott serves as Chairman of the House Agriculture, Chesapeake, and Natural Resources Committee. He also serves on the House Appropriations Committee where he chairs the subcommittee responsible for Agriculture, Commerce, Technology, and Natural Resources. Additionally, he serves on the Science & Technology, and Transportation Committees.

The Virginia Chamber of Commerce has recognized Delegate Scott as a "Champion of Free Enterprise" and Virginia FREE, a leading business and political research organization, has consistently rated Delegate Scott among the leaders in the House of Delegates for his work to protect and strengthen Virginia's business environment. He has also been named Legislator of the Year by the Virginia Horse Council, the Virginia Hunting Dog Owner's

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Association, the Sportsmen's and Animal Owners' Voting Alliance, and the Virginia Wine Council. In 2011, Ed was one of two legislators recognized by the Virginia School Boards Association for his work for public education. Additionally, he was awarded the prestigious Distinguished Friend of Agribusiness Award by the Virginia Agribusiness Council.

Delegate Scott is a past Chairman of the Madison County Planning Commission, an ex-officio member of the Career Partners Board of Directors, and an ex-officio member of the Board of Directors of the Culpeper Chamber of Commerce. Delegate Scott announced earlier this year that he will not be a candidate for re-election in 2015. He looks forward to focusing on his growing business and to looking for new ways to serve his community and the Commonwealth.

Margaret (Peggy) Sanner, Esq.

Peggy Sanner is Virginia Assistant Director and Senior Attorney for the Chesapeake Bay Foundation. She counsels the organization on all aspects of environmental law, with particular emphasis on the Clean Water Act, the Clean Air Act, the Virginia State Water Control Law, fisheries rules, and related laws and regulations. Peggy practices before state and federal courts, agencies and boards and works with the Virginia General Assembly on numerous policy issues related to CBF's mission.

Before joining CBF in 2010, Peggy litigated cases and counseled numerous clients in environmental, technical and other matters, beginning her practice in Pennsylvania at Morgan Lewis & Bockius and serving most recently as counsel with Reed Smith in Richmond.

An active member of the Virginia bar, Peggy received her law degree from Rutgers University School of Law and holds graduate and undergraduate degrees from the University of Pennsylvania and Swarthmore College, respectively. She resides in Richmond.

Laura Cattell Noll

Laura Cattell Noll is a graduate student in the Environmental Sciences Department at the University of Virginia. Her research involves assessing nitrogen fluxes on a local permaculture livestock farm as a way of

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evaluating the impact of alternative agricultural systems on the health of waterways. Before returning to graduate school, Laura worked for the National Aquarium's Conservation department and the Maryland Department of Natural Resources. In both capacities, she managed and implemented watershed restoration and conservation projects across the Chesapeake Bay watershed. She has a B.S. in Environmental Science from Eastern Mennonite University.

Senator Emmett W. Hanger, Jr.

24th District Virginia State Senator Emmett Hanger has a strong voting record of limited government and fiscal conservatism. He values the protection of individual rights, coupled with a keen sense of individual responsibility. More importantly, Emmett believes common-sense solutions in government should win-out over party politics. As a life-long Republican and resident of Augusta County, Emmett first served as Commissioner of the Revenue and then in the House of Delegates. Now as Senator, Emmett has earned a multitude of leadership positions, including being named a budget conferee and Chair of the Health and Human Services subcommittee on Senate Finance and Chairman of the Senate Agriculture, Conservation and Natural Resources Committee. He is very involved in all aspects of the legislature but has become an ardent supporter of all matters dealing with education, mental health, and the environment. He holds several positions on national organizations such as the Southern Legislative Conference and the National Conference of State Legislators.

Emmett is the former Commander of the Harrisonburg National Guard and obtained the rank of Captain in the US Army as an Infantry Officer. He and his wife Sharon have five grown children and enough grandchildren to start their own voting precinct when they are of age.

The 24th District stretches from parts of Culpeper County, all of Madison County, parts of Rockingham County, and all of Augusta and Greene Counties, including the Cities of Staunton and Waynesboro.

Rappahannock River Basin Summit 2015 Speaker Bios

Joseph Grzeika

Mr. Grzeika has been a member of the King George County Board of Supervisors since 1996 and is a former Chair. He is a founding member of the Rappahannock River Basin Commission and a past Chair. He was also a member of the Rappahannock River Basin Study Commission, the predecessor to the RRBC.

He received a Bachelors of Liberal Studies Degree, Computer Science, University of Mary Washington (formerly Mary Washington College) in 1983. He received an Associates of Applied Science Degree, Hartford State Technical College in 1971.

Mr. Grzeika's professional career includes President of Joetech, LLC from 2006 to the present. As Executive Associate with Strategic Insight from 2012 to 2015. First as Vice President from 1985 to 2004 and then as President from 2004 to 2006 of Planning Consultants, Incorporated. He also served as a Project Manager with Syscon Corporation from 1984 to 1985, a Branch Manager with Comptek Research, Incorporated from 1980 to 1984 and as an Electronic Warfare Specialist with the United States Navy from 1971 to 1980.

In addition to almost 20 years on the King George Board of Supervisors he has served on the University of Mary Washington, Board of Visitors since 2011 and is currently Vice-Rector. He serves on the Fredericksburg Regional Chamber of Commerce, Military Affairs Council Board of Directors and is Past Chairman. He is a member of the Board of Directors of the Fredericksburg Regional Alliance and the Board of the Rappahannock United Way. He previously served on the George Washington Regional Commission, the Rappahannock Regional Jail Authority, the Rappahannock Economic Development Corporation, the Rappahannock Area Development Commission and the King George County Planning Commission.

Bettina Ring

Bettina Ring was appointed State Forester by Gov. Terry McAuliffe. Ring most recently served as Senior Vice President of Family Forests at the American Forest Foundation where she was responsible for overseeing the American Tree Farm System®, the largest and oldest sustainable woodland

Rappahannock River Basin Summit 2015 Speaker Bios

program in America, supporting more than 80,000 family forest owners collectively managing 27 million acres of certified woodlands.

Ms. Ring has a long history in the conservation and forestry sectors, having spent 14 years at the Virginia Department of Forestry (VDOP), departing the agency in 2001 as Deputy State Forester. In her role, Ms. Ring was responsible for operations, and helped to develop and implement a new mission, vision and strategic plan for the department. In the years following her VDOP service, Ms. Ring held various leadership positions within nonprofit organizations focusing on natural resources management and conservation, including the Colorado Coalition of Land Trusts, The Wilderness Land Trust and the Bay Area Open Space Council. Ring holds a Bachelors degree in Forestry and Wildlife from Virginia Tech and a Masters degree in Business Administration from James Madison University.

Gregory Evans

Greg joined the Virginia Department of Forestry in 2012. He is responsible for a statewide program focused on reducing the rate of upland forest conversion in the Commonwealth. He also leads the Department's Chesapeake Bay program efforts and is one of Virginia's six representatives on the Citizens' Advisory Committee to the Chesapeake Bay Executive Council. Greg has served Virginia in many natural resource roles including President of the Virginia Association of Soil & Water Conservation Districts, Northern Virginia Soil & Water Conservation District Director, Chair of the Chesapeake Bay Local Assistance Board, Chair of the Potomac Watershed Roundtable, Chair of the Fairfax County Park Authority Board and as a member of the Virginia Chesapeake Bay Restoration Fund Advisory Committee, Virginia Land Conservation Foundation Board of Trustees, the Governor's Commission on Natural Resources Funding, and the Northern Virginia Conservation Trust Board of Directors.

He is retired from careers in the private sector environmental consulting industry ending at Booz Allen Hamilton and the federal government at the White House, EPA, Department of Energy, U.S. Synthetic Fuels Corp. and as US Congress staff. He holds a Master in Natural Resources degree from Virginia Tech, an MBA from The George Washington University, and a B.S. in management from Bryant University. He and his wife Sue live in Fairfax County. They have three grown children and four grandchildren.

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Michael Collins

Michael Collins has been the Executive Director of The Center for Natural Capital since 2012, when he led the merger of Conserv with Public Policy Virginia, Inc. (PPV), a non-profit organization focused on the use of biomass for combined heat and power. The Center is the recipient of the 2014 Sanctioned Event of the Year from the American Canoe Association and a 2015 Commendation from the Virginia General Assembly, sponsored by Virginia Delegate Ed Scott and State Senator Emmett Hanger. With four colleagues he founded the forerunner of the Center, The Association of Conservation Real Estate - Conserv, in 2006. From 2004-2009, he led the creation of a new Planning Department for the Town of Orange, Virginia. As the Town's first Community Development Director working with a great group of citizens, the Town of Orange completed its first Capital Improvements Plan, Proffer Policy, Joint Proffer Policy, and an American Planning Association (APA) award winning Comprehensive Plan leading to later adoption of a new Form-based Zoning Ordinance. For his conservation work with the Town, in 2005, Mike received the Chairman's Award from the Culpeper Soil and Water Conservation District. In 2009 Conserv partnered with the Rappahannock River Basin Commission and the Virginia Department of Forestry on several market-based conservation programs and projects.

In 2002, he and Dr. Nick Evans formed Virginia Groundwater, LLC, a science-based well drilling firm that continues today as The Center for Sustainable Groundwater (CSG). In 2000, he began working as a water resources consultant and led several hydrogeologic and EPA award winning source water protection studies. In 1998, he and his family opened Healthy Home, LLC, a sustainable goods general store in Charlottesville, to provide environmentally friendly construction supplies to the Charlottesville region. From 1990-1998, Mike worked as an Environmental Planner for the Thomas Jefferson Planning District Commission in Charlottesville and led several groundwater, surface water, and sustainability projects and programs including the Rivanna River Basin Roundtable and the State of the Basin Report, the Interfaith Roundtable on Sustainability, and the Thomas Jefferson Sustainability Council and the Sustainability Accords of 1998. The Sustainability Council was selected as a Case Study of the President's Council on Sustainable Development. He began his career as a tenured science teacher with Culpeper County Public Schools.

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He is a former member of the American Institute of Certified Planners (AICP) and a Class C contractor.

Mac (McGann) Saphir

Mac (McGann) Saphir served as Agriculture Extension Agent in Caroline County from September 1990 until July 2010. He has been on the Board of the Hanover/Caroline Soil and Water Conservation District since 1994 as the Secretary, and Extension representative, until his retirement in 2010. He is now an elected member of the Hanover/Caroline Board, and past Chairman.

Mac has worked extensively in the water quality area. He is the past co-Chairman of the Education and Public Relations workgroup of the Rappahannock Conservation Council, a past Director on the Rappahannock Conservation Council, and currently a member of the Rappahannock River Basin Commission representing the Soil and Water Conservation Districts in the basin. He has been the Water Quality specialist for Extension in the Northern District of Virginia. He has received a number of awards for his water quality related efforts in the Rappahannock and York River Basins.

Mike Randall

Mike has over 45 years of project management, construction, and environmental compliance experience - including 22 years with General Motors, 12 years with private consulting firms, and 11 years with the North Carolina Department of Environmental and Natural Resources.

Representative Rob Wittman (VA-01)

Rob Wittman was elected to represent Virginia's First Congressional District in December 2007 and is currently serving his fourth full term in the House of Representatives. He serves on the House Armed Services Committee, where he is Chairman of the Readiness Subcommittee, and the House Committee on Natural Resources.

Since taking office, Rob has earned a reputation for being an advocate for our men and women in uniform and for being a champion of the Chesapeake Bay.

Rappahannock River Basin Summit 2015 Speaker Bios

Prior to his election to Congress, Rob spent 26 years in state government as a public health specialist. He also served as mayor of the town of Montross, chairman of the Westmoreland County Board of Supervisors and delegate for the 99th Legislative District in the Virginia General Assembly.

Rob holds a Ph.D. in Public Policy and Administration from Virginia Commonwealth University, a Master of Public Health degree in Health Policy and Administration from the University of North Carolina, and a Bachelor of Science degree in Biology from Virginia Tech.

Rob and his wife, Kathryn, reside in Montross and have two children and three grandchildren.

Melanie D. Davenport

Melanie has been the Director of the Water Division since May of 2011. In 2008 she returned to DEQ as the Director of Enforcement. She had previously worked for the State Water Control Board and DEQ as the Enforcement Manager, the Assistant Air Division Director and as a special assistant to the Secretary of Natural Resources.

Melanie also worked for the Virginia legislature, serving three years as the Virginia Director of the Chesapeake Bay Commission. Prior to returning to DEQ, she spent 10 years practicing environmental law at Troutman Sanders. Melanie received her BA from Boston University in marine biology and her law degree from William and Mary.

“Actors” in the Simulation – Is Nutrient Trading Really Workable? (if not already listed)

Kevin Utt

Kevin previously worked for over 20 years in the aerospace industry and holds an aeronautical engineer’s degree.

For the past 15 years, Kevin has worked in the environmental field for local governments in the Commonwealth. He has diverse experience in many areas from environmental planning to permitting, Nutrient Management, and the DEQ’s Brownfield program. He is DEQ certified in E&S, SWM, CFM and has various other environmental certifications.

Rappahannock River Basin Summit 2015 Speaker Bios

Kevin has been with the City of Fredericksburg for the past eight years, administering the E&S, VSMP, the Chesbay program, the National Flood Insurance Program, Wetlands, the MS4 program, and assists with the city's DEQ VEEP- Environmental Management System program. He serves as a technical assistance member to the Rappahannock River Basin Commission, and other local environmental groups and committees for storm water, WQ and environmental related topics.

Michael E. "Zeke" Moore, P.E. – Sullivan Donahoe & Ingalls
(Engineering & Survey services company)

Mr. Moore has been involved in civil engineering and land planning design for the past twenty five years and has demonstrated expertise in subdivision design, grading, storm drainage, stormwater management, LID (low-impact development), Integrated Management Practice design, flood and drainage studies, Chesapeake Bay requirements, VSMP permit requirements, SWM water quantity and quality designs, and water line and sewer line design. He is a graduate from the Virginia Military Institute and a licensed Professional Engineer in Virginia.

David Nunnally

Va Tech graduate. Worked with environmental programs for nearly 30 years, beginning with erosion and sediment control in 1978 as construction inspector with VDOT. Then 10 years with DCR. Helped create the ESC Regulations and the Va Erosion and Sediment Control Handbook. Worked with local gov't environmental programs at Hanover County (2002-2006) and currently at Caroline County (2006--current).

Sean Simonpietri

Mr. Simonpietri is a Civil Engineer, a graduate of Virginia Tech. He worked in construction for 20 years at Landsaver Environmental. In 2013 he started Exact Stormwater Management to help engineers, municipalities, and contractors deal with new stormwater regulations.

Rappahannock River Basin Summit 2015 Speaker Bios

Ross D. Pickford

Mr. Pickford has been working in the environmental field since 1978 and with stormwater management issues since 2004. He is currently President of Earth Solutions, LLC and the Chief Operations Officer of Earth Concepts, LLC. He has extensive knowledge and experience with Low-impact Development (LID) stormwater management and has been working as the technical consultant to the Washington, D.C., Department of Environment's RiverSmart Communities program tasked with installing LID technologies on multi-family residential complexes, houses of worship, and small business commercial properties within the District. Mr. Pickford participated with local government officials and other interested parties in the Northern Virginia Regional Commission Workgroup developing the Low-Impact Development Supplement to the Northern Virginia BMP Handbook. Currently, Mr. Pickford is assisting the George Washington Regional Commission and their local jurisdictions with Chesapeake Bay TMDL and VSMP issues as well as other stormwater management problems. In addition to his government related work, Mr. Pickford is also actively engaged with nutrient and stormwater trading in residential and commercial development and has participated in workshops focused on improving trading protocols.

David Perdue

Mr. Perdue is a real estate developer/investor primarily in the field of historic preservation. Projects he was involved with in Georgia, South Carolina and Virginia have won numerous awards for historic rehabilitation and historic preservation. David moved with his wife and three children from his hometown of Atlanta, GA to Somerset, VA in 2003. Since arriving in Virginia he has enjoyed serving the Boards of Grymes Memorial School, Piedmont Environmental Council and Orange Downtown Alliance. In Atlanta he continues to serve as Chairman of the Board of A.G. Rhodes Health & Rehab, Inc. He earned a B.A. from Washington & Lee University. David is Vice-Chair of the Board of the Center for Natural Capital and has been instrumental in the success of the StreamSweepers project.

Rappahannock River Basin Summit 2015 Speaker Bios

James Parker

Mr. Parker is a Director at Falling Springs LLC and has been with the company since its inception in 2007. With Falling Springs, he leads sales and business development efforts in order to provide environmental mitigation solutions for our clients & customers. James has coordinated and closed several hundred mitigation transactions that help our customers comply with and satisfy federal, state and local permit requirements for their projects. James has led or assisted on the acquisition and entitlement of Falling Springs' current portfolio of over 20 mitigation and water quality projects across five states. James holds a M.B.A from the Darden School of Business at the University of Virginia and a B.A. in business administration from James Madison University. In his free time, James enjoys spending time with his family, hunting, fishing, and golf. He lives in Richmond, VA with his wife, Molly, and two children, Blair and Jimmy.

Allan Brockenbrough, P.E.

Mr. Brockenbrough is a career employee at the Department of Environmental Quality. He spent his first 17 years at the agency managing the municipal VPDES permitting section in DEQ's Piedmont Regional Office. In 2002 he moved to the water permitting section in DEQ's Central Office where he served as the VPDES water quality modeling coordinator as well as the manager of the nutrient trading program for the Chesapeake Bay watershed. He is currently the manager of the VPDES permitting program in DEQ's Central Office.

Evan Branosky

Evan Branosky is an Environmental Protection Specialist for the District of Columbia Department of Energy and Environment. In this capacity, he manages the District's Stormwater Retention Credit (SRC) trading program, which is the first program of its kind in the nation. Through the program, sites install voluntary green infrastructure to retain rainwater and generate SRCs. Other sites buy SRCs in an open market and use them to meet their post-construction regulatory requirements for retaining stormwater. Previously, from 2005 to 2013, Evan worked at the World Resources Institute, where he developed market- and performance-based programs for

Rappahannock River Basin Summit 2015 Speaker Bios

surface water quality in the United States and abroad. In 2012 and 2013, he chaired the EPA Chesapeake Bay Program Trading and Offsets Workgroup, which is a standing committee of 60+ members that coordinates efforts to develop trading programs in Bay jurisdictions. Evan has written reports on trading, hydraulic fracturing, and the net public benefits of oil and gas infrastructure. He was a Peace Corps volunteer in Haiti and holds a B.S. in agricultural science from Rutgers University and an M.P.P. from the University of Maryland, College.

Patrick Coady

Pat Coady has a life long career in investment banking. He is currently Senior Director at Seale & Associates, Washington DC.

Between 1989 and 1993, Pat was U.S. Executive Director of the World Bank. He has had stints as Chief Financial Officer at such diverse companies as a billion dollar financial services company as well as a start-up rocket development enterprise.

Since 2009 he has raised capital for mitigation banking firms and species banks such as sage grouse. In January 2014 he co-organized major conservation finance workshops in San Francisco and New York City bringing together the leaders in the field.

Pat contributed to the book *From Walden to Wall Street* and organized a 2007 Conservation Finance Workshop in New York City. Pat is a senior fellow at Conservation International. In 1994, Pat co-founded and is currently Chairman of the Northern Virginia Conservation Trust.

Pat is a graduate of Massachusetts Institute of Technology and the Harvard Business School. He resides in Washington, DC.

Rappahannock River Basin Commission Summit Nutrient Trading Simulation
The Actors

G'niles Barklay, The Stage Manager
Gilbert Gotcha (F'burg Urban MS4 Buyer)
Tom (Big Money) Janowski F'burg Commercial Developer Buyer
Ricky Slicky Fredericksburg University MS4 Buyer
Robert Bob City & Town Department of Transportation
Elmer Jones Agricultural Term Credits Seller
Big Joe Beamer Fredericksburg Suburban Credits Seller
Emerson (Tug) Tunstall Upper Rapp. Ag. Conversion Credits Seller I

Trader Joe Lower Rapp. Ag. Conv. Credits Seller II
Hugh Bean Virginia State Credit Registry and Act I and II Transactions Referee
Lorenzo Escafe DEQ In Lieu Fee Manager
Old McDonald Agricultural Term Credit Seller and Old McDonald Nutrient Credit Aggregators LLC
Blair Fodderstack, Director

Eldon James, RRBC
Kevin Utt, City Fredericksburg
Zeke Moore, SDI
David Nunnally, Caroline County
Sean Simonpietri, Exact Stormwater
Mac Saphir, HCSWCD
Ross Pickford, Conservation Concepts
David Perdue, Rappahannock Environmental Bank

James Parker, Fallings Springs LLC

Allan Brockenbrough, VDEQ
Evan Branosky, DC Stormwater Division

Pat Coady, Northern Virginia Land Trust
Michael Collins, Center for Natural Capital

The Actors are sitting in a semi-circle facing the audience. At the center of the semi-circle is the Stage Manager. To his right are the Buyers. To his left are the Sellers.

Stage Manager:

- Welcomes the Audience to the Play.
- Explains that the Play is a Simulation of the kinds of nutrient credit trading that can occur or could occur in Virginia.
- Explains that there are two Acts. The first Act is the Trading World in Virginia as we currently think we understand it. The second Act could be the Trading World in Virginia in the future with new enabling legislation and/or transactional functions and entities.
- Introduces the Cast.
- Notes that is supposed to be factual and also fun.
- Briefly review the 2-page Nutrient Trading Primer.

Act I

Gilbert Gotcha: Brief explanation of the MS4 permit. He says he has two types of nutrient problems he may want to use offsets to help with. He says he has the Chesbay TMDL and he needs to reduce nutrient load by 117 lbs. N and 24 lbs. P and 9370 lbs of TSS (the measure of sediment) by 2018. He goes on to explain that under the City's future MS4 permit requirements by 2028 they will have to have removed a total of 2352 lbs of N, 488 lbs of P and 187,406 lbs of TSS for permit compliance. He says that if the City implements reductions, the cost per lb. P is

likely to be as high as \$28,000. He wants to know if there is anyone that can sell him offsets that will be less costly? He also notes that there's already a political disincentive to buy offsets because citizens will ask why tax dollars are being spent outside of the city. Then he says the City is building a new development project on forest land in a 3 acre site and the VSMP requires that he limits the load to .41 lbs./acre and he wants to know if he could meet this standard through offsets – meaning how much to buy 1.23 lbs. P?

Stage Manager: Please note that the numbers for N and TSS are in development and so as we go through the rest of this simulation we will be only simulating P credit transactions.

Hugh Bean: Explains how in the MS4 program P and N can be bought and sold separately. He also explains in VSMP how they have to be bundled and the currency is P. In the ChesBay TMDL world buyers and sellers are interested in N, P and TSS but if they are merely in the VSMP world they are dealing in P (N is retired with P).

Elmer Jones: Says he has term credits. We will be implementing early planted cover crops, continuous no-till, 15% -N reduction on corn, and converting some marginal cropland to riparian buffers and areas. The total land area to be put into BMP's is about 1000 acres. Of this, about 20 acres of marginal land will be involved in the land conversion. We hope to generate about 3500# in N credits, and 320# P credits annually.

Hugh Bean: Explains what Term Credits are and how Term Credits cannot be used to meet the .41 lbs./acre standard for VSMP but they can be used by MS4s in the TMDL program to address time-limited issues.

Tom (Big Money) Janowski: I am a developer and I have a question – so I can't buy these Term Credits from Mr. Jones?

Hugh Bean: Explains that how the program has been set up is a permanent change to the land requires a permanent offset so the answer is no.

Old MacDonald: Why is there not a third party out there that can pool or aggregate my credits and others credits and also why is it not possible to figure out some fancy mechanism like the big dogs do on Wall Street to bundle term credits that could be sold in a manner that achieves perpetuity? This would allow ag. sellers to find new development buyers.

Hugh Bean: Explains what other states do.

Old MacDonald: By the way I have looked into doing what Elmer is doing but have concluded that my farm is too small so the costs of getting into the nutrient business is too expensive and time consuming. Also I am overwhelmed by the paper work and procedures. There should be a better way for us smaller farmers.

Hugh Bean: Responds.

Emerson (Tug) Tunstall, Trader Joe: Says that their banks have credits for sale.

Stage Manager: Points out that there is strong concern in some circles that trading should not be allowed downstream if water quality is already impaired. He asks if any of the City has any locally impaired waters (i.e. a local TMDL) that would require all nutrient trades to be upstream.

Gilbert Gotcha: No, none of our local TMDLs are for nutrients, our problem there is fecal coliform bacteria. It is my assumption that under the rules we can buy P either up or downstream.

Emerson (Tug) Tunstall Agricultural: Says his credits are upstream so I can sell them to you either way. He goes on to say how many he has and the price he is looking for.

Trader Joe: My credits are downstream of the City. He says how many he has and the price he is looking for.

Hugh Bean: Explains that currently it is possible that a project's receiving stream could be impaired for nutrients, but because no local TMDL has been approved, a downstream credit could be purchased.

Stage Manager: Says that these interactions illustrate legitimate concerns of some environmental groups that current program is structured to possibly allow trades to occur that could diminish local water quality.

Gilbert Gotcha, Emerson (Tug) Tunstall, Trader Joe: *This will be back and forth between parties – resulting in a purchase of some amount of credits at some price.*

Tom (Big Money) Janowski: I'm a private businessman and I have purchased a small commercial property on which to build a building for my company. Existing commercial sites bound my property, so it's an "in-fill" condition. I've laid out my site for a proposed building and related parking and access for my business. I have little to no room left on my property for BMPs due to the small size of the property, existing grades, and existing development bounding the property. I need to provide .5 lbs of removal for water quality purposes and as I said I have no room for BMPs on-site, except for possibly going to more expensive pre-fabricated commercial BMPs or underground beneath parking/drive areas. I'd like to be able to purchase .5 pounds of credits instead of squeezing a BMP onto my site under conditions that are much less than ideal. I'm willing to pay \$7,000 for a .5 lbs of credits.

Emerson (Tug) Tunstall: Says he's not willing to sell fractions of credit. Not worth transaction hassle.

Trader Joe: Says he has a concern with the statement made earlier that it should be possible to have term credits that could be assured in perpetuity. He says that he knows he is not alone in

that concern and he does not see how something that is not permanent can be packaged to look and act like it is.

Emerson (Tug) Tunstall: Well sir, I disagree, I wish I could sell my credits to an aggregator, so I could focus on the bank and get out of the middleman role.

Tom (Big Money) Janowski: That sounds great, but I have been unable to find any aggregator to sell me any credits. I only need .5 lbs of credit, but they have to be perpetual credits. Even if term credits were allowed for my situation I would not want to periodically have to deal with getting new credits at the end of a term to keep my site in compliance, I want perpetual credits so that my site stays in compliance. Is there anyone out there that can help me?

Stage Manager: Explains how an “aggregator” works and how they could hypothetically bundle term credits so that the buyer purchases something that meets the requirement to be permanent. This however is not something that is provided for in Virginia.

Trader Joe: I am happy to sell you a few credits at a time even fractions of 1. We can make the deal today.

Robert Bob: Explains how they operate similar to VDOT. For projects of less than 5 acres and less than 10 lbs. of required reductions or where 75% of the reduction can be accomplished onsite the purchase of credits from banks that meet the proximity requirements has been a good solution. I know my friends at VDOT have bought over 160 lbs. since 2013 but it’s been mostly in the James and Potomac basins, where the projects have been. Like VDOT, CTDOT buys our credits through sealed bids, low bidder wins. This is part of the procurement rules that we live by, its just like buying pencils or automobiles.

Emerson (Tug) Tunstall: Says that he feels that there should be discussion about merits of using sealed bid process. He further explains how the sealed bid doesn’t allow creation of any real market because there is no price discovery.

Robert Bob: Explains that there is no Exchange today so there is no way right now to do what Tug wants.

Stage Manager: Points out that the aspect of this Simulation, where sellers reveal their pricing – is not actually occurring anywhere in Virginia because of the lack of an Exchange - this may be leading to higher unit costs than would otherwise be the case. Price discovery does exist in at least one program where trades are bought and sold through a reverse auction process in the Great Miami watershed in Ohio.

Emerson (Tug) Tunstall: So how much are you guys willing to pay? *I know this gets into sensitive issue potentially, so we can discuss.*

Ricky Slicky: We at the university share the same concerns of Mr. Gotcha. We don't want to buy offsets. We want to fix up and improve our property, right here. We would like to keep the money local. Why can't I work with a local developer who needs land for a bmp and put a bmp over here on University property? We have a spot that *probably* needs fixing but nobody is going to do it unless there's something in it for them.

Big Joe Beamer: I'm Big Joe Beamer and I am an urban/suburban developer with a number of older rental properties. I'm interested in constructing stormwater BMPs on these unregulated properties and offsetting the cost through nutrient trading. Unfortunately, as I've looked into the numbers, for us to manage stormwater runoff from 1 acre of land using bioretention, we need to treat approximately 25,500 gallons of runoff. My engineering cost to design and permit these systems is about \$40,000 and the cost of construction is about \$115,000. The minimum cost to register the potential nutrient credits with the DEQ is \$4,000. Based on the VA Runoff Reduction Method, this treatment scenario will remove 1.95 lbs. of phosphorous per year which exceeds the target reduction by 0.2 lbs. per year. With the need to meet the baseline, my cost per pound is \$795,000. Without the need to meet the baseline management requirements, the annualized cost per pound of phosphorous reduction is about \$81,500.

Now if I use a scenario where I'm re-developing a property, and decide to over build our BMP capacity to create trading credits, the engineering costs to generate the trading credits will be incorporated into meeting the baseline BMP designs. If we decide to increase the BMP capacity to remove an additional 1 lb. of phosphorous our construction costs would be approximately \$59,000. With the added minimum fee for the nutrient trading program of \$4,000, the total cost for 1 pound of phosphorous removal using bioretention would be roughly \$63,000. This would most likely represent my minimum cost for developing nutrient trading credits in an urban environment. Even at this level, my potential credits are not competitive with the Ag and Conservation credit prices.

Ricky Slicky: I don't understand the need for meeting baseline. I mean, I understand that the point is that without a baseline, the folks who already spent money fixing existing problems and putting in bmps will feel like they missed out on an opportunity. The way I see, they did a good thing and they should feel good for that. For me, money is tight at the University. The only way I can reduce pollution is to work with somebody like **Tom (Big Money) Janowski**. For him to develop his project, he has to reduce pollution but doesn't have the land to do it. I'd be happy to work with Tom: He gets what he needs, the University looks "greener," and everybody is happy.

Stage Manager: This issue about baseline was discussed a lot when the original framework for Virginia's Trading Program was created. There was lots of disagreement about if and how to do a baseline. Washington D.C. for instance, does have the baseline requirement. So does North Carolina but in North Carolina they can sell credits for practices implemented to achieve the baseline in addition to the practices implemented beyond the baseline – thereby removing the kind of cost barrier Old McDonald mentioned.

That's the end of Act I; What did we learn?

- **Gilbert:** This is complicated
- **Elmer:** Term credits have been enabled under Virginia law but as of yet there is no market; some say there is no demand but others would say the market has not developed because there is not enough flexibility in the regulations.
- **Hugh:** There are opportunities for trading that works well and they are occurring.
- **Ricky Slicky:** They may be occurring, but it's not enough for me.
- **Big Money:** I want to build in the city but it's too expensive.
- Did someone say it's complicated?

Act II

Stage Manager: Stands to tell the audience to now fast forward to 2018. The world of nutrient credit trading has changed in the following ways:

1. Change baseline requirement to the North Carolina model; If the generator of the credit does not use public money (such as cost share) to install a practice whether its to reach the baseline or the go beyond then the credit can be put on the trading market.
2. Creation of Old McDonald Nutrient Credit Aggregators.
3. Strengthen the requirement that only upstream trades are allowed for impaired streams whether a local TMDL/impairment exists or not.
4. Term credits used for VSMP are further enabled in a way to allow bundling so that they can be sold to meet the VSMP requirement when offsetting a permanent change to the landscape.
5. Create an option to purchase credits from in lieu program

He invites the audience to return to the Act I discussion to see how the transactions change.

Gilbert Gotcha: Says the City met its 2018 goals and now we are moving into the next MS4 permit cycle, 2018-2023. We now need to reduce nutrient loads by 823 lbs. of N, 170 lbs of P and 65,590 lbs of TSS by the end of permit cycle 2023. Who wants to sell credits and how much do they cost?

Trader Joe: Says the availability of term credits for VSMP and the option of an in lieu fee has driven down the cost of their credits.

Old MacDonald: I sold my farm and decided to go into the business of helping small farmers benefit from nutrient trading. The 2017 reductions, now that they have kicked in have created significantly more demand and the addition of buys from existing stormwater (MS4s) also increased demand. Also increasing demand was in lieu program. I find I can make a living advising small farmers and aggregate credits. This can also provide a product to buyers of smaller or term credits.

Trader Joe: Well, I just want to say this. When we started aggregating term credits thought these brokers and then allowed them to be perpetuated we introduced a whole lot more smoke and mirrors into this whole thing. It's hard enough to get a handle on what the real reductions are with these offset programs and now we have essentially nutrient trading derivatives that Old McDonald has created and it's kinda harder to tell what the real science is behind this stuff.

Old MacDonald: I believe my aggregating business increases the supply of credits, offers a lower cost solution to certain buyers and fills a niche on both seller side and buyer side. This has been going on for a number of years in other states.

Gilbert Gotcha: Okay, well all this is fine but frankly, we just want to know what your bottom line cost is per lb. N and P?

Trader Joe: I can solve your problem right now with the new bank I've opened upstream. I'll sell you credits for X.

Old MacDonald: Well, what term do you want to buy? We can sell you one year credits, 5 year credits, 10 year credits, or in perpetuity. The cost varies based on life of credits. The longer the term, the higher goes the unit cost.

Ricky Slicky: Let me say something here. A few years ago, we worked a deal with **Tom (Big Money) Janowski**. He built a bmp on our property. That solved his problem, improved our site, and it hardly cost me anything. All I did was record an easement for a bmp and a maintenance agreement. Now, we are an MS4 just like the Fredericksburg, Fauquier and Stafford folk, and have a pollution reduction requirement. We bought some term credits, thinking another opportunity might come along, like the deal with Tom, but having to keep up with these credits every couple years is a pain. I've got bmp maintenance to do, and I'm getting tired of Old McDonald and the other salesmen always knocking on my door.

Trader Joe: Just like with Gilbert we can solve your problem permanently with one transaction.

Old MacDonald: Well Trader, we have been working to offer an affordable perpetual credit using some packaging and credit bundling. That would also free Ricky from this responsibility. We take the responsibility of providing Ricky with the certainty that the reductions are in place.

Gilbert Gotcha: Hey Big Joe Beamer, now that you can sell credits for improvements you make to get to the baseline can you give me a price?

Big Joe Beamer: Well, I can but the urban/suburban retrofit practices are still so expensive that I can't compete with the Ag and Conservation BMP guys. Prices are a little closer but it's not competitive. As a matter of fact, since I can purchase credits for under \$20,000 per lb. P, that's less than my cost to construct BMPs on my properties, therefore there is really no reason for me to do any stormwater management on my new developments. It is much less expensive for me to just purchase credits.

Robert Bob: The buying we have done has been successful for us. We have to do some of those expensive retrofit kind of things and we believe the credit buying has held down costs somewhat. As I look forward, for some of our bigger projects on the horizon, where the right-of-way is tight to be more flexible than the 5 acre/10 lbs. limitations could be a big help. Of course I recognize the sensitivity that exists relative to the Chesapeake Bay so maybe that added flexibility a pipe dream in the Bay region. Maybe my transportation friends in the non-Bay portion of the state could benefit from greater flexibility there. Sorry guys I kinda went off on a tangent.

Gilbert Gotcha: I wonder if Spotsylvania County Facilities or a neighboring locality, and I'm thinking wastewater treatment plants here, would be interested in selling some of the short term credits for our loads. We're going to have an unexpected shortage next year. We have planned a city capital improvement project that includes a nutrient reduction component as Robert Bob rebuilds some streets but the financing got hung up and they're behind schedule by 1 year. I have got to bridge the gap/unexpected shortage for this permit cycle until the project comes online, then I can take the reduction credit. If we fail to meet our reductions temporarily it's a potential problem even though its only short term. But I don't know that we want to fool with buying from an Aggregator, the smoke and mirrors thing does make me nervous. Mr. Jones, how much are you selling your 1 year credits for?

Elmer Jones: I'm a farmer, I don't have time to deal with buyers, we've sold all our credits to Old McDonald, you're going to have to talk to him.

Gilbert Gotcha: Mr. Escafe, maybe it would just be easier to do an in lieu fee. How much is this option?

Lorenzo Escafe: Explains how the ILF program works and how it is priced...

Ricky Slick: I think we might be interested in the ILF because it is so easy. And I won't have to deal with my salesman friends.

Gilbert Gotcha: So Tug, did you sell all your credits to Old McDonald?

Emerson (Tug) Tunstall: Yep, we sold out in 2017. I'm now retired and no one makes salesman jokes about me anymore.

Tom (Big Money) Janowski: Look folks, time is money and I'm getting tired here. Here's what I need to know right now – I'm building my new WaWa and I need perpetual credits. I don't care where they come. I only care how much they cost and I don't want to have to fool around too much with brokers, so I also want to know where can I buy them? So I can get what I need from Old MacDonald?

Old McDonald: My team is ready to speak with you 24/7 Mr. Janowski. We want to be competitive and make the process painless.

Trader Joe: Well, we have not sold out to Old McDonald and we are happy to sell in amounts less than a lb. And remember we have upstream credits with no smoke and mirrors.

Lorenzo Escafe: And though we might be more expensive you can always buy using ILF from us.

Tom (Big Money) Janowski: Okay, let me hear your prices one more time...

Stage Manager: So, What did we learn:

- **Gilbert:** Did someone say it's complicated?
- **Big Joe Beamer:** the change to the baseline requirement did not make urban/suburban retrofits competitive enough to work in the trading market.
- **Trader Joe:** The requirement that all trades be upstream made my investors and I have to refocus our attention upstream of the City, it cost us a lot of money to stay in business and our downstream bank is just sitting there waiting for some development activity in the lower Rappahannock. I'm hoping Jack Miller and Lewie Lawrence can help me with that. And with Old McDonald's aggregating my margins are lower.
- **Elmer Jones:** I'm sorry for James Parkers margins but with Old MacDonald's aggregating my margins have improved with the enhanced ability to market my good stewardship Ag practices in the trading world and I'm not using cost share.
- **Lorenzo Escafe:** The ILF just offers another option, it is more expensive then what you can buy from Old McDonald or James Parker and that is purposeful but it sure is more convenient for Tom (Big Money) Janowski. And we have used the Fund to finance and build some high-quality projects and I like to encourage the big contractors we work with to donate to the good works of Big Joe Beamer and the River Lovers.

Stage Manager: Different players have different motivations –

- Buyers want the best prices, want to buy it and forget it (transfer worry).
- Sellers want to maximize their ROI and want to minimize risk (relationship with regulators) and want the ability to be creative in a market that allows flexibility.
- Regulators want these activities to result in clean water. They want to foster economic activity that does not degrade water quality. They want simplicity and certainty.
- Some of these motivations naturally compete with each other.
- Continuing to look for program enhancements means evaluating the trades offs associated with each choice.

We hope you got some insight on trading with our 2 Act play because as Gilbert likes to say – its complicated! We have a few minutes for questions or observations.

Virginia Nutrient Credit Trading Primer

What is nutrient credit trading?

Nutrient credit trading is the exchange of targeted nutrients (N and P) to comply with water quality goals. This could include trading to meet nutrient loading caps established for various sectors under the Chesapeake Bay TMDL or trading to meet the post construction water quality criteria of 0.41 lbs/acre/year for new development under the Virginia Stormwater Management Program (VSMP). In 2005 HB 2862 authorized trading within major river basins in Virginia to comply with nutrient load caps initially established for point sources under the Virginia Tributary Strategies. These point source load caps have subsequently been superseded by waste load allocations in the Chesapeake Bay TMDL.

Presently trading is only allowed between point sources to meet the initial point source load caps under the TMDL. If one point source has excess capacity it is allowed to sell or trade that to another facility that is not meeting its caps. Trading between non-point sources and point sources is reserved for: (1) offsetting new or expanding point sources, (2) providing more cost effective nutrient reductions for Municipal Separate Storm Sewer Systems (MS4s) under the Chesapeake Bay TMDL or (3) offsetting loads from new or expanding Combined Animal Feeding Operations (CAFOs) in need of a point source waste load allocation. Permanent nonpoint source credits may also be used under the VSMP program to offset the impacts associated with new development.

Point source and Non-Point source

The terms point source and non-point source distinguish between sources of pollution that originate from a pipe or ditch (point sources) versus sources that are more diffuse such as a runoff from a farm field (nonpoint sources). Nonpoint sources such as runoff from a suburban development may become point sources if the stormwater is collected and routed through a ditch or pipe.

Perpetual and Term Nutrient Credits

Trades to meet the post construction design criteria for new development of 0.41 lbs/acre/year under the Virginia Stormwater Management Program must make use of perpetual or permanent credits. Under this program a developer is foregoing the installation of a permanent BMP which must be maintained for another permanent reduction provided elsewhere. These credits are most often provided by reforestation projects with the newly forested parcel being protected in perpetuity by a permanent deed restriction.

Term nutrient credits are nutrient savings that are generated over a finite period of time. Term credits may be proposed for multi-year practices however they must be certified on a year to year basis.

Examples of this would be continuous no-till systems, early planted cover crops, and reduced nutrient application (these are usually referred to as BMP practices). The use of term credits is authorized in Virginia for the offsetting new or expanding point sources, providing nutrient reductions for MS4 jurisdictions and providing allocations to new or expanding CAFOs in need of a point source nutrient waste load allocation. However the lack of demand from new or expanding point sources, MS4 jurisdictions and CAFOs has prevented a viable market from being established.

Who are the perspective buyers of nonpoint source credits?

New or expanding waste water treatment plants; MS4 localities; new or expanding CAFO's (concentrated animal feeding operations) in need of a point source allocation; and builders/owners needing to offset the nutrient impacts associated with stormwater loads from new development (permanent offsets only).

What practices will generate nonpoint source credits?

Land conversion (reforestation) projects, agricultural and urban BMPs, stream restoration projects, etc.

What do existing markets look like now, and where are they?

Point source trading is allowed in many states, as it is in Virginia. In our general area, Pennsylvania and Ohio have developed term nutrient trading markets. Contracts are established between "aggregators" who contact and line up the farmers and bundle their BMP practices into nutrient credits that are sold to point sources, developers, and others needing nutrient credit offsets.

What is the status of nutrient trading in Virginia?

Virginia has a very active point source-to-point source trading market established under a watershed VPDES permit. The exchange of nonpoint source credits in Virginia has been limited to permanent offsets being used to mitigate stormwater impacts associated with new development. To date, roughly 600 lbs of permanent Phosphorus offsets have been sold in approximately 1 lb increments. These offsets have been generated by land conversion projects and one urban BMP. Permanent offsets have sold for between \$8,000 and \$28,000 per pound of Phosphorus depending on location. It is hoped that the high cost of providing nutrient reductions in the MS4 sector will create the need for agricultural BMP term credits in the future. However, due to the phasing of the required MS4 reductions, actual demand for such credits may be 8 years or more into the future. Virginia DEQ is currently developing regulations on the certification of nonpoint source credits and expects to complete that process in 2016.

Urban/Suburban Nutrient Credit Analysis

A primary benefit of a nutrient trading program is to create opportunities for stormwater management on properties where such management does not currently exist, thus increasing nutrient reduction in local waterways. In determining the parameters for developing a nutrient trading scenario for the Urban/Suburban credit analysis, our focus was on the costs associated with developing stormwater management on such unregulated properties. An unregulated property in this scenario is one, either currently developed or undeveloped, where stormwater management technologies are not present and which are not required. Level 2 bioretention was chosen for the cost comparison due to its relatively high nutrient removal effectiveness along with its relatively low cost of implementation in relation to other BMP systems.

Based on experiences of installing bioretention facilities in the greater Washington D.C. area, Conservation Concepts developed a scenario in which a hypothetical nutrient trading partner (credit provider) had a site on which approximately one (1) acre of the entire site was impervious surface. Using DEQ's Runoff Reduction Method analysis to calculate the size and functionality of bioretention facilities to remove phosphorous (the common nutrient trading measurement as identified in the proposed nutrient trading regulations) we were able to determine necessary capacities for a series of bioretention facilities.

As Table 1 illustrates, the site would require Level 2 bioretention facilities that would capture 3,449 cubic feet of runoff. Using the reduction runoff methodology, DEQ would require capturing 1.76 pounds per year of phosphorous. The bioretention facility(s) would effectively capture 1.95 lb/yr., thus these facilities would have a surplus of .22 lbs/yr. of phosphorous.

Under the proposed nutrient regulations, the issuer of credits must meet minimum baselines that require any site to meet current DEQ runoff reduction targets. For example, the hypothetical site described above would need to capture the 1.76 lbs/yr. of phosphorous to meet the baseline, then any amount of capture above that could be sold for credits. Thus, this site could issue .22 lbs/yr of phosphorous credits.

Conservation Concepts used this hypothetical site to develop cost estimates for constructing the necessary bioretention facility(s) on an unregulated site (a currently developed site without stormwater management BMPs). Table 2 includes these estimates and also indicates what it would cost, on a per credit basis, for a property owner to recover their investment in the bioretention construction cost.

To determine the size, and thus the construction costs of the bioretention facility, Conservation Concepts converted the 3,449 cubic feet of runoff into gallons. This calculation indicated that the stormwater facility would need to treat approximately 25,800 gallons. It was then determined that it would be necessary to construct about 6 large (4,300 gallon) rain gardens to accommodate this much runoff volume. Based on past construction experience, these six rain gardens would cost approximately \$118,713. We then added in engineering costs (\$39,000), DEQ's proposed fee to be in the nutrient trading program (\$4,000) and the total costs of the bioretention facilities came to \$181,713. With the proposed baseline, this site would only be able to sell .22 phosphorous credits, thus for comparative purposes, a single credit using these types of facilities might cost as much as \$796,000. Without the baseline, the per credit cost is closer to \$89,000. It should also be noted that these costs do not include on-going maintenance costs that would be associated with each bioretention facility to maintain their capacity to remove phosphorous into the future.

If we use a scenario where development is occurring on a property, but we decide to over build our BMP capacity to create trading credits, the engineering costs to generate the trading credits will be incorporated into meeting the baseline BMP designs. If we decide to increase the BMP capacity to remove an additional 1 lb. of phosphorous our construction costs would be approximately \$59,000. With the added minimum fee for the nutrient trading program of \$4,000, the total cost for 1 pound of phosphorous removal using bioretention would be roughly \$63,000. This would most likely represent the minimum cost for developing nutrient trading credits in an urban environment.

Table 1
Runoff Reduction Analysis for 1 Acre of Impervious Surface

Site Results

	D.A. A	D.A. B	D.A. C	D.A. D	D.A. E
IMPERVIOUS COVER	1.00	0.00	0.00	0.00	0.00
IMPERVIOUS COVER TREATED	1.00	0.00	0.00	0.00	0.00
TURF AREA	0.00	0.00	0.00	0.00	0.00
TURF AREA TREATED	0.00	0.00	0.00	0.00	0.00
AREA CHECK	OK	OK	OK	OK	OK

Phosphorus

TOTAL TREATMENT VOLUME (cf)	3,449
TOTAL PHOSPHORUS LOAD REDUCTION REQUIRED (LB/YEAR)	1.76
RUNOFF REDUCTION (cf)	2759
PHOSPHORUS LOAD REDUCTION ACHIEVED (LB/YR)	1.95
ADJUSTED POST-DEVELOPMENT PHOSPHORUS LOAD (1/P) (LB/YR)	0.22
REMAINING PHOSPHORUS LOAD REDUCTION (LB/YR) NEEDED	

CONGRATULATIONS!! YOU EXCEEDED THE TARGET REDUCTION BY 0.2 LB/YEAR!!

Nitrogen (for information purposes)

TOTAL TREATMENT VOLUME (cf)	3,449
RUNOFF REDUCTION (cf)	2759
NITROGEN LOAD REDUCTION ACHIEVED (LB/YR)	15.48
ADJUSTED POST-DEVELOPMENT NITROGEN LOAD (TN) (LB/YR)	0.02

Table 2
Urban/Suburban Bioretention Facility Potential Credit Costs

FACILITY	Drainage Area	Volume/Size (gallons)	Cubic Feet	Lbs TP Removed	Const. Costs	Eng. Cost ¹	DEQ Registration Fee	Total Const. Reg. Cost ²	Unit Cost/Cubic Ft	Annual Maintenance Cost	Potential Credits with Baseline	Estimate Cost Per 1 Credit with Baseline ³	Estimate Cost Per 1 Credit Without Baseline
6 - 4,300 Gallon Bioretention Facility	1 Acre Impervious Surface	25,800	3,449	1.95	\$ 118,713	\$ 39,000	\$ 4,000	\$ 161,713	\$ 46.89	\$ 13,500	\$ 0.22	\$ 796,344	\$ 89,853

1) Includes conceptual design, E&S plan, and SWMP @ \$6,500/facility.

2) Construction + Engineering costs + DEQ Fee.

3) Total Construction Costs plus one year annual maintenance fee divided by .22 available credits.

Tim Ware

From: Doug Pickford <doug@conservationconceptsllc.com>
Sent: Sunday, October 04, 2015 10:23 AM
To: Tim Ware
Cc: Ross Pickford
Subject: Summit File #1
Attachments: 1-Agenda Final 91715.doc; 2-Presenter Bios.docx; 6-1160_001.pdf; 8-Nutrient Trading Play - 9-22-15 FINAL Version.docx; 9-VA Nutrient Credit Trading Primer-AB -final.docx; 10-Urban_suburbanNutCreditAnalysis Final 9-15 Copy.doc; 11-NC SW Programs.pdf; 12-Rappahannock River Basin Summit_09-23-15 Davenport.pptx; badges-18161420297.pdf; ATT00001..txt

North Carolina's Stormwater Programs

Mike Randall

mike.randall@ncdenr.gov

(919) 807-6374

Photo by Vance Miller



NC Department of Environment and Natural and Resources	
Division of Water Resources (DWR)	Division of Energy, Mining and Land Resources (DEMLR)
<p>NPDES POINT SOURCE</p> <ol style="list-style-type: none"> 1. Industrial Waste Water Program 	<p>NPDES NON POINT SOURCE</p> <ol style="list-style-type: none"> 1. Individual and General Permits for Construction and Industrial Activities 2. NPDES MS4 Program 3. NCDOT – TS4 Program
<p>STATE STORMWATER PROGRAMS</p> <ol style="list-style-type: none"> 1. 401 2. NCDOT SW Permitting 3. Planning 4. TMDLs 5. Nutrient Sensitive Waters <ul style="list-style-type: none"> Neuse and Tar-Pamlico Basins Jordan Lake Falls Lake Randleman Lake 	<p>STATE STORMWATER PROGRAMS</p> <ol style="list-style-type: none"> 1. High Quality Waters 2. Outstanding Resource Waters 3. Coastal Rules 4. WS I, II, III, and IV Goose Creek

Post Construction Requirements administered by Local Governments

- Water Supply Watershed
 - WS-I, WS-II, WS-III and WS-IV
- Nutrient Sensitive Waters (NSW) Management Strategies
 - Neuse River Basin
 - Tar-Pamlico River Basin
 - Randleman Lake Water Supply Watershed
 - Jordan Water Supply
 - Falls Reservoir Water Supply Nutrient Strategy
- NPDES MS4 post-construction requirements

MS4 Program

- 101 Small MS4s
 - 89 with Individual Permits
 - 2 Co-Permits w/6 local governments each
- 4 Military Bases
- 6 large MS4s
- 7 Non-traditional MS4s
 - NCDOT
 - UNC
 - NC State
 - Global Transpark
 - Sandy Point Development
 - Charlotte Mecklenburg Schools
 - Piedmont CC

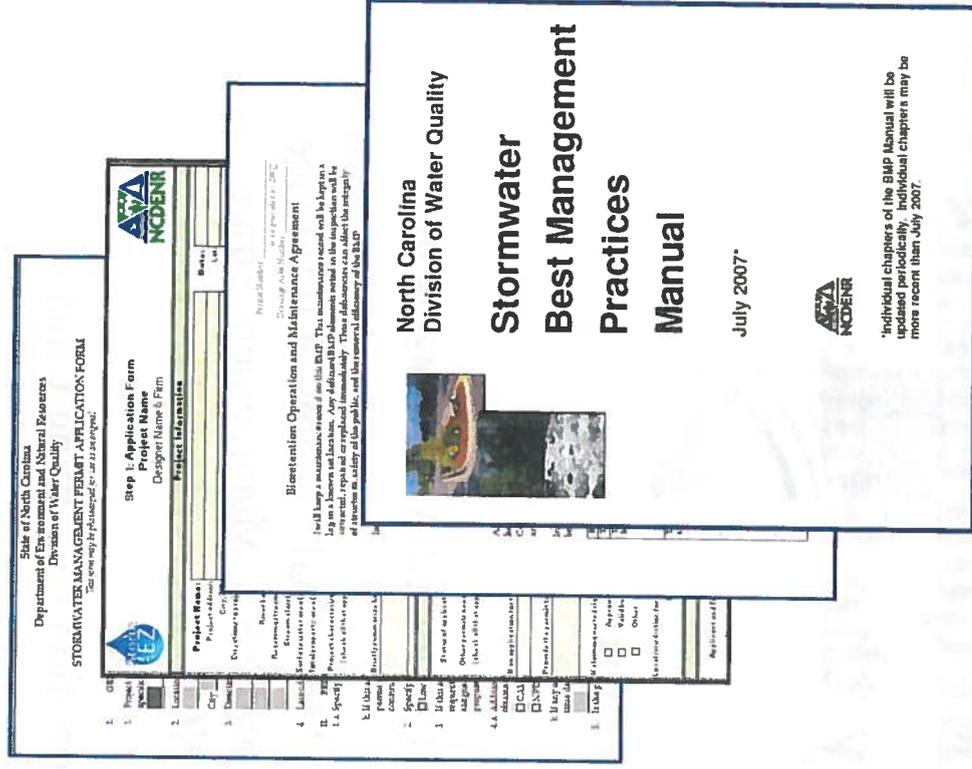


Post Construction Requirements administered by the State

- Regional Office (DEMLR)
 - Freshwater High Quality Waters (HQW)
 - Freshwater Outstanding Resource Waters (ORW)
 - Coastal Rules
- Central Office (DEMLR)
 - Post-construction requirements within the Urbanized Areas outside the jurisdiction of the local governments
 - Post-construction requirements within NC Municipal Spheres of Influence (MSI) and tipped in Counties outside WS and NSW Management Strategies
- 401/404 Impacts to waters of the US and NC buffers (DWR)
- NCDOT projects
 - All Stormwater Permitting (DWR Transportation Permitting Unit)
 - NCDOT Industrial Activities (DEMLR)
 - Sedimentation and Erosion Control (DEMLR)

Review and Approval Process

- Preliminary Review Checklist
 - Application and plans
 - Storm EZ or SWU101
 - Supplement forms
 - O&M
- Verify compliance with the Rules
 - BMP Manual
 - Minimum Design Criteria (MDC)
 - DENR Design Recommendations
- Additional Information
- Permit templates and typical cover letters



Land Quality

- [Contacts](#)
- [Erosion and Sediment Control](#)
- [Stormwater](#)

- [FAQ](#)
- [Fees](#)
- [Staff Contacts](#)
- [Public Notices](#)
- [NPDES Stormwater](#)
- [State Stormwater](#)
- [Construction Stormwater](#)
- [Water Supply Watershed](#)
- [Stormwater BMP Manual](#)
- [Phase II Designations](#)
- [Interactive Permitting Map & GIS](#)

- [Reuse ISW Program](#)
- [Universal SW Program](#)
- [Rules and Laws](#)
- [Submittal Meetings](#)
- [Presentations](#)
- [Outreach & Training](#)

- [Dams](#)
- [Mining](#)
- [Energy](#)
- [Publications](#)
- [Local Programs](#)
- [Coming Events](#)
- [Links](#)
- [Footer](#)

Stormwater Permitting Program

The Stormwater Permitting Program develops, plans and implements statewide stormwater control policies, strategies and rules designed to protect surface waters of North Carolina from the impacts of stormwater pollutants and runoff. Staff handles permitting for industrial, municipal and post-construction (for development projects) stormwater programs, as well as providing technical assistance to the regulated community, engineers, industry, citizens and local governments.

[Stormwater Education & Outreach Website](#)

General Permit NCG210000 (Timber Products) has been issued and became effective August 1, 2013.
 We e-mailed renewal instructions and PINs to permittees that requested electronic renewal on Thursday, August 1st. The entire NCG210000 Print Package (with monitoring forms) is available here.

NCG050000, NCG070000, NCG110000, NCG130000, NCG130000 Print Packages for permittees renewing coverage. These general permits became effective June 1, 2013.

Permit Info

- [Permitting Programs](#)
- [Watershed & Impaired Waters Info](#)

The following list is provided for informational purposes only and accurate as of the date of posting:

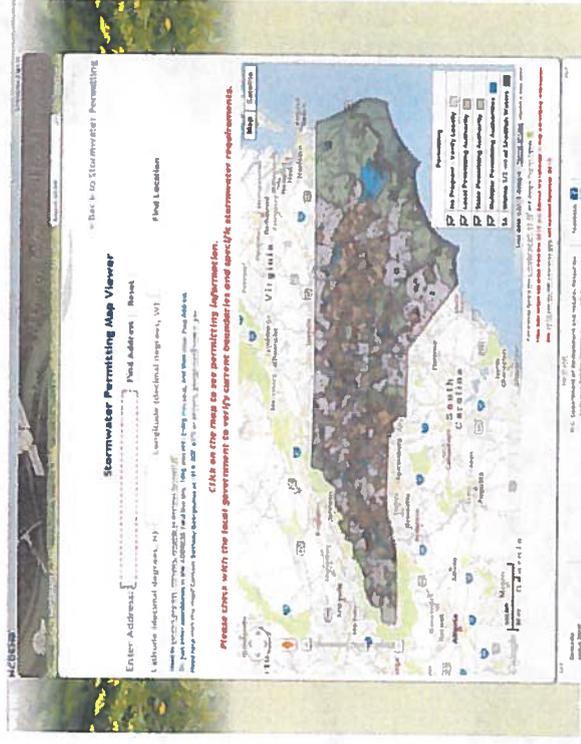
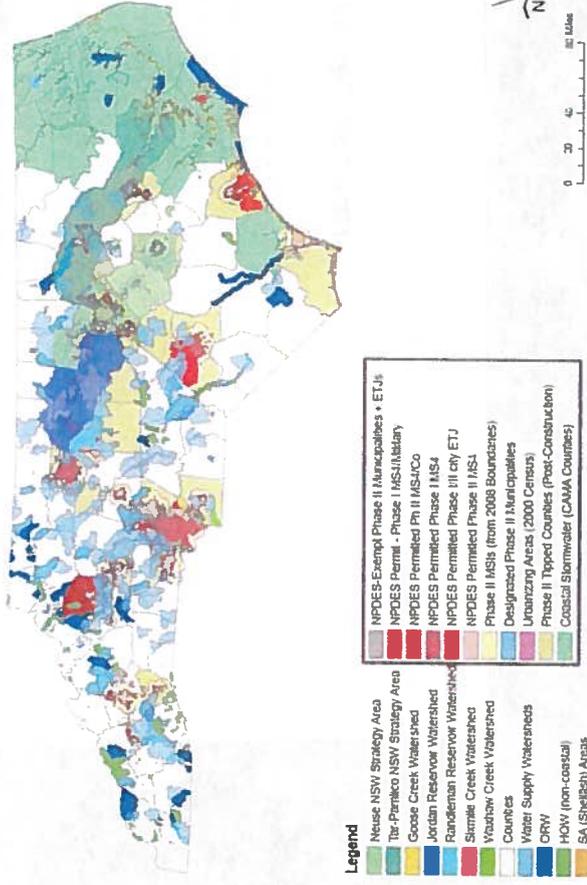
- [Active IPDES Stormwater Permit List - last updated 7/11/2013](#)
- [Active State Stormwater Permit List - last updated 7/11/2013](#)
- [Active Stormwater Permits Map Updated July 2013](#)

NPDES Industrial Stormwater General Permits [Click here.](#)

State Stormwater/Post-Construction Projects [click here.](#)
Looking for the Stormwater Permitting Interactive Map?

Post-Construction Stormwater Management Programs

- 65% of the State has some stormwater program
- On-Line Map Viewer
- Helps track where programs apply



<http://portal.ncdenr.org/web/lr/sw-permitting-map>

Post Construction Programs

- Low Density
 - One acre or more and
 - Generally < 24% Built-Up Area (BUA) with no piped conveyance
- High Density
 - One acre or more
 - Piped conveyance or > 24% Built-Up Area (BUA)
 - 1 inch, 1.5 inches, or the difference between the pre and post for the One year 24 hour storm
 - Design Criteria
 - Draw down the treatment volume no faster than 48 hours, but no slower than 120 hours.
 - Discharge the storage volume at a rate equal to or less than the predevelopment discharge rate for the one-year, 24-hour storm.
 - Remove an eighty-five percent (85%) average annual amount of Total Suspended Solids.
 - Minimum Design Criteria (MDC)

North Carolina's LID Initiative

Maintain and restore the hydrologic regime by creating a landscape that mimics the natural hydrologic functions of infiltration, runoff, and evapotranspiration.

- *NC LID Guidebook*

Quantitative LID Definition



**Volume of runoff
AFTER
development**



**Volume of runoff
BEFORE
development**



+

**Streams and wetlands receive flow
rather than piping stormwater to
low point(s)**

Summary of Rainfall Fates Pre- and Post-Development

Runoff Volume Match Achieved!

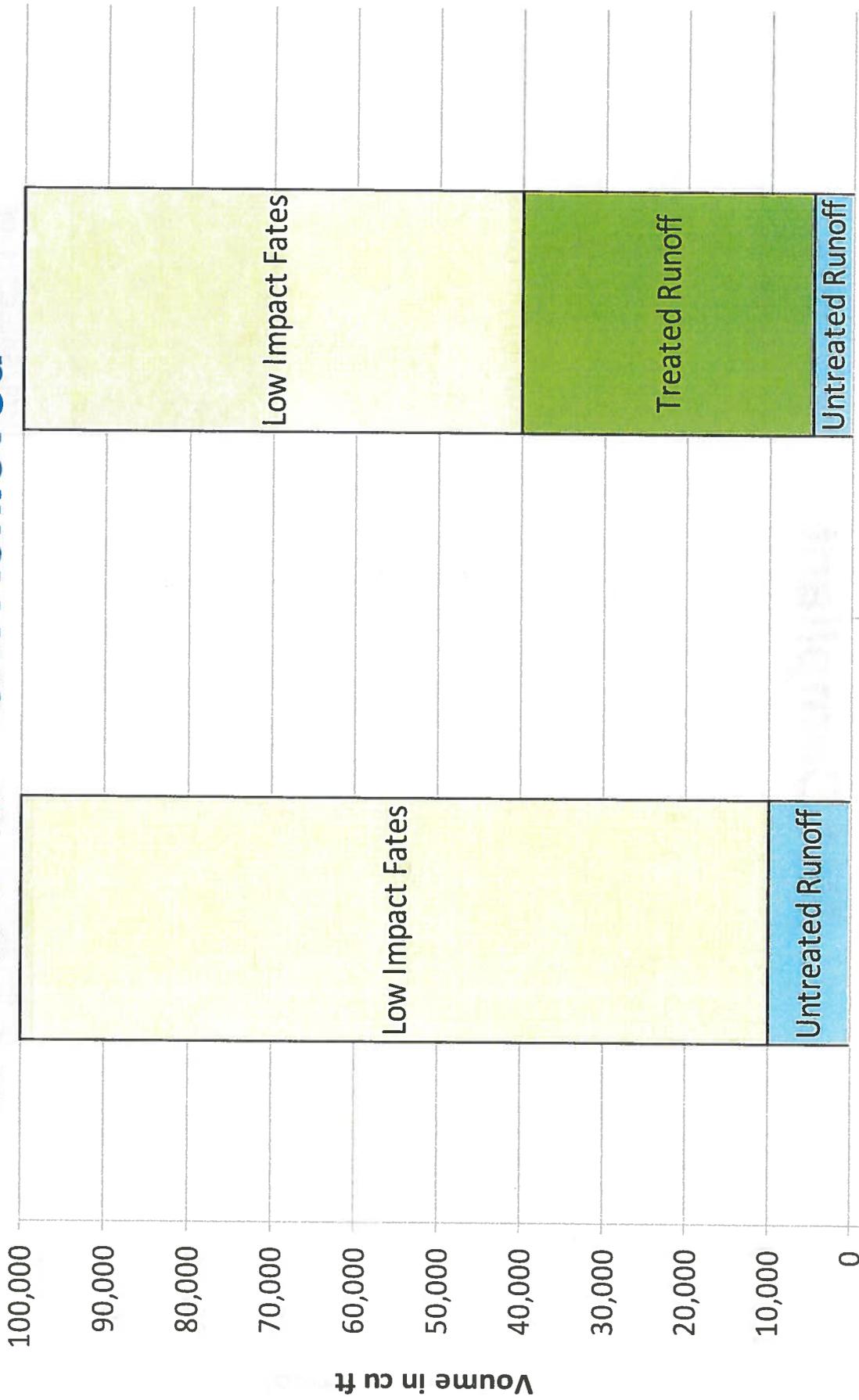


Pre-Dev

Post-Dev

Summary of Rainfall Fates Pre- and Post-Development

Runoff Treatment Achievement

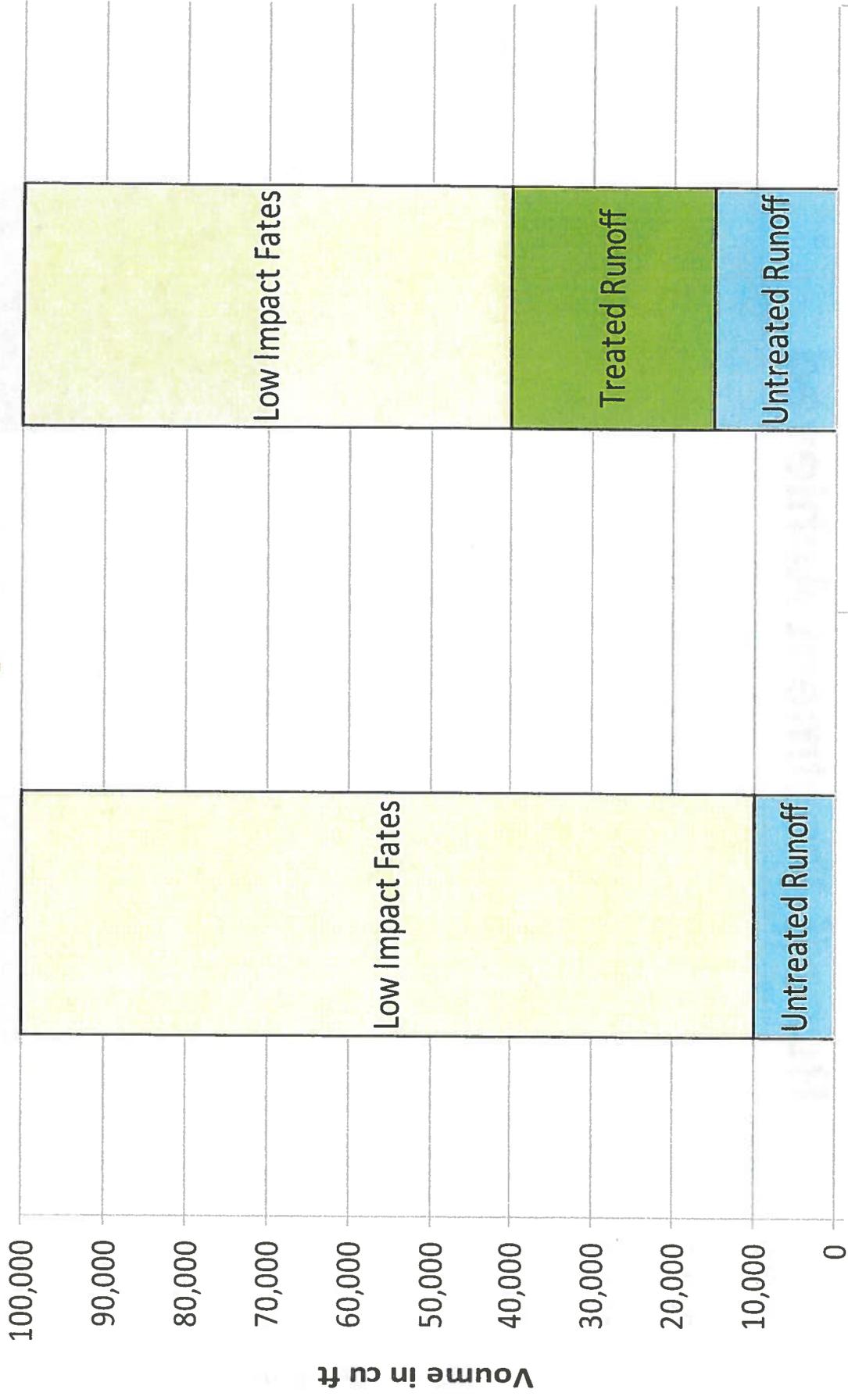


Pre-Dev

Post-Dev

Summary of Rainfall Fates Pre- and Post-Development

Not Compliant



Pre-Dev

Post-Dev



Swansboro Methodist Church Sanctuary and Ministry Center

Swansboro, NC ONSLOW County

White Oak River Basin

Drainage Area # 1 of 1



POST-DEVELOPMENT LAND USE CALCULATIONS

Permeable Pavement:

SCM #	HSG	Pvmt Type		Pavement Area		Additional BUA		Infiltration Rate (in/hr)	Void Space (%)	Total Gravel Depth (in)	Has Synthetic Liner?	Orifice Dia. (in)	Orifice Height (in)	Down-stream SCM	Infiltration Check	Detention Check
		(sf)	(acres)	(sf)	(acres)											
500				0.00		0.00					No					

Add Rows

Delete Bottom Row

Green Roofs:

SCM #	DSD (in)	PAW (%)	D _{gr} (in)	Area		Retrofit?	Downstream SCM #	Comments
				(sf)	(acres)			
600	1.72			0.00		No		

Add Rows

Delete Bottom Row

Residential Lot CN Calculator (Excluding RW and dedicated open spaces):

Lot Area (sf)	(ac.)	# of Lots	Max Imp / Lot		Woods / Lot (sf)	Open Space / Lot (sf)	Avg Lot Size
			(sf)	% Imp.			
	0.00						

Remaining Land Use:

HSG	Land-Use	Area	
		(sf)	(acres)
C	Impervious	165,848	3.81
C	Open Space (Managed Open Space)	149,286	3.43
C	Woods (Preserved Open Space)	74,150	1.70
	Permeable Pavement + BUA:	0	0.00
	Green Roofs :	0	0.00
	Sub-Total:	389,284	8.94

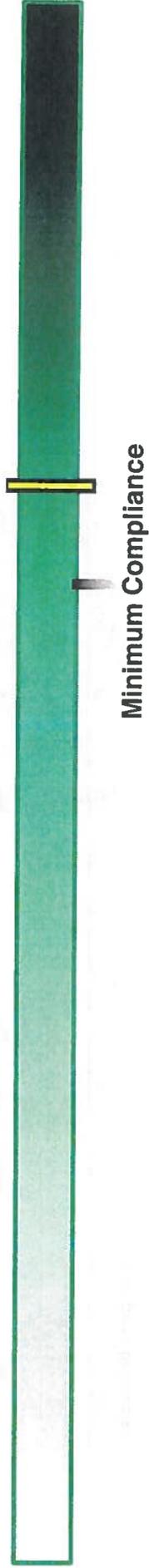
Add Land Use Rows

Delete Bottom Row

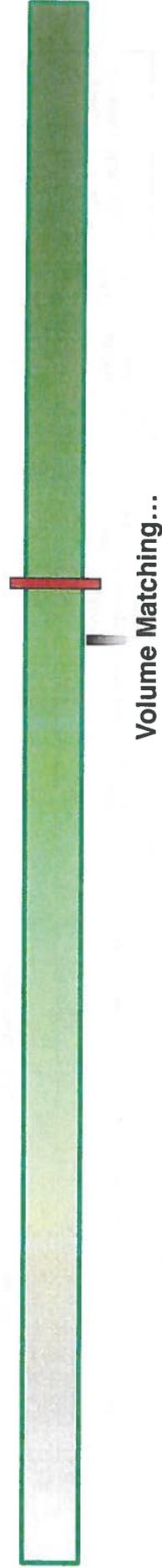
Land Excluded, or Partially Excluded, from Volume Calculations:

	(sf)	(ac.)
Surface Waters & Non-Coastal Wetlands	0	0.00
Coastal Wetlands	0	0.00
Total Site Area:	389,284	8.94

COMPLIANCE SCALE



VOLUME MATCHING SCALE



Post Construction Requirements

- Why treat stormwater runoff if you can eliminate it?
- Volume Matching
 - Low density or high density
 - One acre or more
 - Match the Pre and Post stormwater runoff using low impact practices
 - 90% Storm
 - Meet Minimum Design Criteria (MDC)
- Reduce the runoff volume  Reduce the size of the SCM
 - Incorporating “low impact” practices even if they cannot achieve “volume matching”

Initiative to Identify and Foster Partnerships

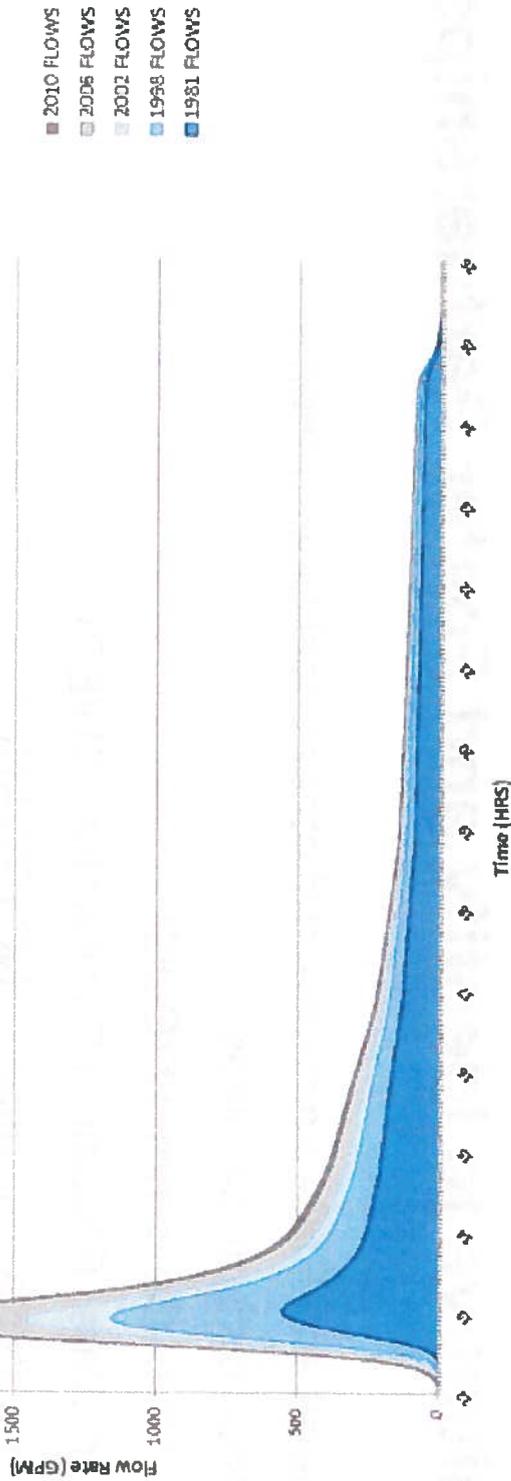


Initiative to Identify and Foster Partnerships

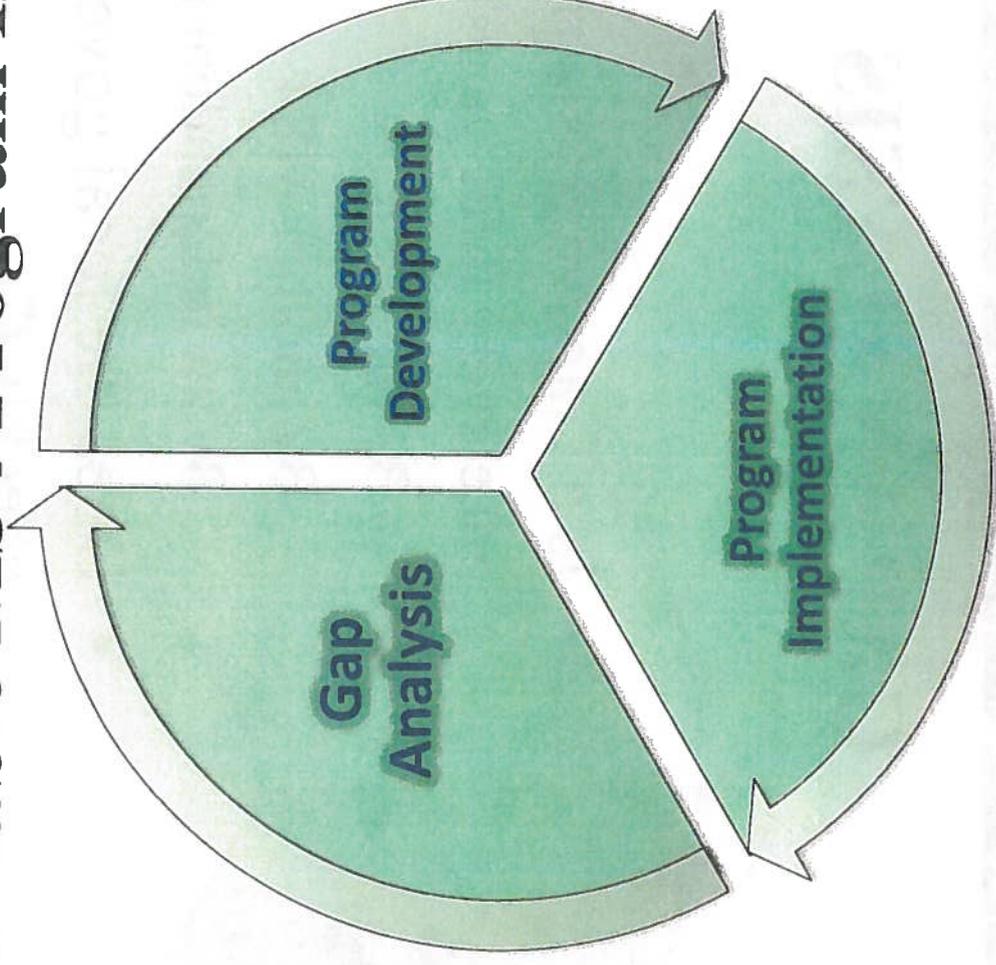
- Federal and State Agencies and other Local Governments
- League on Municipalities
- Council of Government (COG)
- Clean Water Education Partnership (CWEP)
- Stormwater Association of NC (SWANC)
- American Public Works Association (APWA)
- Water Resources Research Institute (WRI)
- NC Cooperative Extension
- NC State Biological, Agricultural, Engineering Stormwater Engineering Group
- UNC School of Government
- Environmental Groups
- Engineering Firms and Consultants
- Realtors, Home Builders Association, Developers

North Carolina's Impaired Waters Initiative

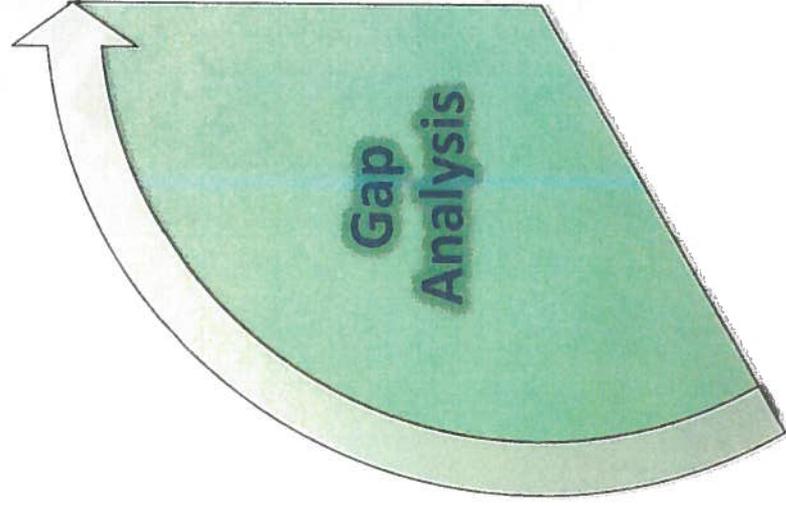
BRADLEY CREEK WATERSHED
1-YR STORM HYDROGRAPHS



North Carolina's Sustainable MS4 Program Initiative



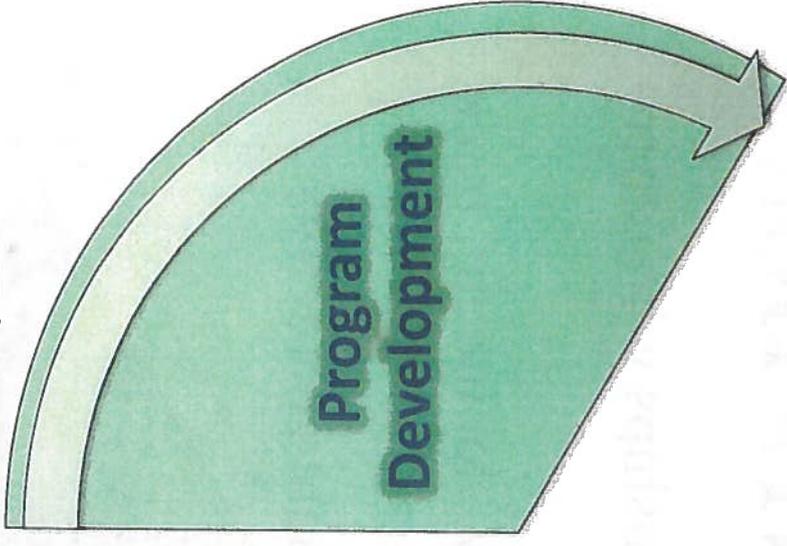
GAP ANALYSIS



- Is a Gap Analysis performed at least once every three years:
 - By the MS4
 - By another MS4
 - By an independent third party
- Does the local government use a checklist?

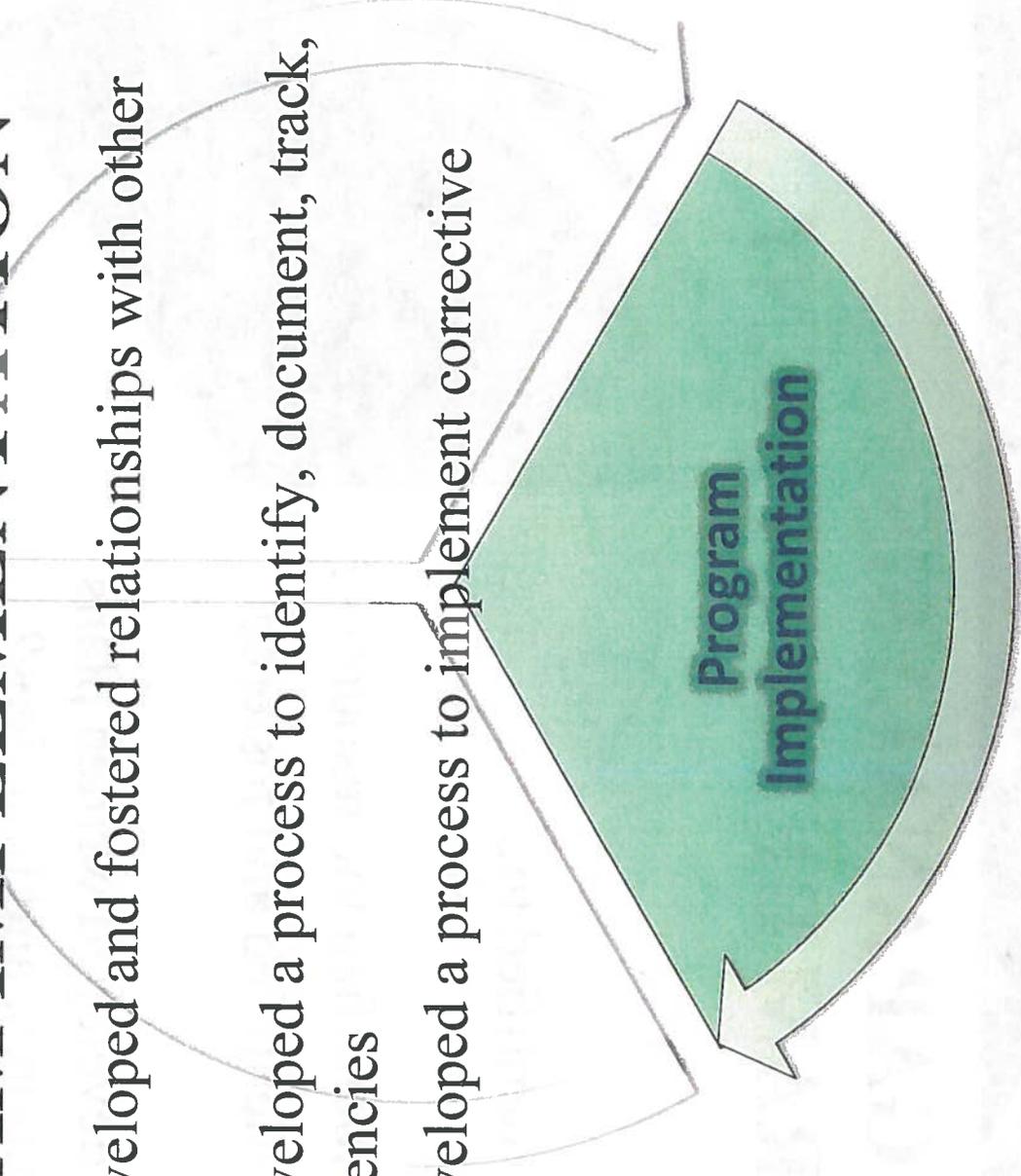
GAP ANALYSIS PROGRAM DEVELOPMENT

- Has the MS4 identified the requirements?
- Has the MS4 identified the resources?
- Has the MS4 identified and fostered partnerships?
- Has the MS4 developed written plans, policies, procedures, and practices?



GAP ANALYSIS PROGRAM IMPLEMENTATION

- Has the MS4 developed and fostered relationships with other departments?
- Has the MS4 developed a process to identify, document, track, and report deficiencies
- Has the MS4 developed a process to implement corrective action?



North Carolina's Stormwater Programs



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Photo by Vance Miller

2015 Rappahannock River Basin Summit

Melanie D. Davenport
Director, Division of Water Permitting
Virginia Department of Environmental
Quality

September 23, 2015



Stormwater Management



PHASE I MS4 Permits

- Arlington, Chesterfield, Prince William, Henrico and Fairfax issued
- 2nd round of draft permits sent to remaining Tidewater localities (Chesapeake, Virginia Beach, Portsmouth, Norfolk, Hampton, and Newport News); locality comments due October 9th
- VDOT will be issued individual MS4 permit

PHASE II MS4 Permits

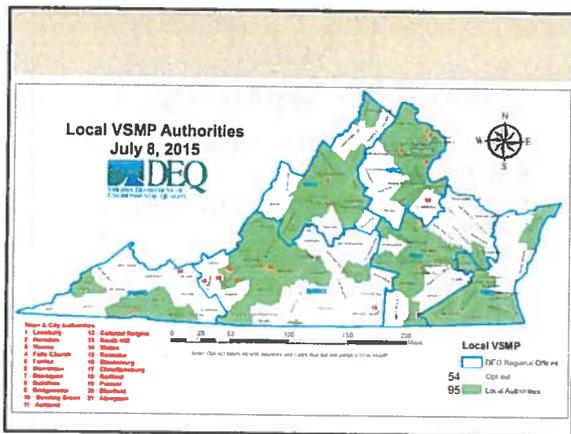
- GP Coverage provided July 1, 2013
- Permits require program plans to address minimum control, and structural storm water controls measures such as urban housekeeping (e.g. street cleaning) public education, identifying unauthorized connections
- Permits also require TMDL action plans for the Chesapeake Bay and local watersheds
- Bay TMDL action plan completed by July 1, 2015 and submitted as part of the September 2015 annual report

CHESAPEAKE BAY TMDL ACTION PLANS

- DEQ issued guidance in August 2014
- Provides consistency in reporting as well as ensure that compliance and program evaluations are handled uniformly
- In May 2015 Guidance was clarified for a number of issues related to crediting and reporting of BMPs (BMPs installed prior to 2009, credit guarantees based upon financing, and forested land loading and reductions).

DEQ MS4 Inspections

- Past year 10 Phase II MS4 inspections
- 2016 Compliance Monitoring Strategy
 - 28 Phase II MS4 Audits
 - Risk Based Approach



VSMP Reporting

- Annual Report - due October 1
 - The number and type of enforcement actions
 - The number of exceptions granted
- Since the permanent BMPs are already being reported through the Construction General Permit database, there is no need to provide that information on this form.
- Stormwater Utility Reporting - due October 1

CONSTRUCTION GP

- 2014 Construction GP in FY 2015
 - 4211 permits issued
 - 739 Issuances
 - 54 Modifications
 - 70 Ownership Transfers
 - 97 Terminated
- Paid out \$9.8 million to VSMP localities for local portion of the 2014 Construction GP reissuance

CONSTRUCTION GP

- Construction GP database for VSMP localities and DEQ operational since July 1;
 - additional capabilities added this year (permit modifications/transfer, enhanced reporting
 - Inspection module and GIS capabilities planned for release by the end of October

VA Stormwater Management Program Best Management Practices (BMPs)

- VA Stormwater BMP Clearinghouse
- 15 Non-Proprietary BMPs
- In May of 2014 issued guidance on interim use of Proprietary BMPs (Manufactured Treatment Devices) to meet the Part IIB technical criteria
 - 24 Proprietary MTDs have been approved
 - Reviewing sizing requirements

INDUSTRIAL STORMWATER GENERAL PERMIT

- Reissued July 1, 2014 - 1190 active ISW GPs
- Benchmark and effluent monitoring required on a semiannual basis
- ISW GP universe has had a historically higher rate of non-compliance relative to submittal of DMRs. Submittal of DMRs were required on an annual basis in the previous GP
- July 2014 ISW GP requires DMR submittals twice per year, January for the reporting period of July through December and July for the period of January through June

INDUSTRIAL STORMWATER GENERAL PERMIT Cont'd

- Compliance and permitting ISW guidance has been issued and is accessible on the Virginia Town Hall Website and the Agency internet site
- DEQs 2015 VPDES Compliance Monitoring Strategy recommends that ISW GP holders that don't submit required DMR are to be targeted for an inspection during the current inspection cycle (FFY2015) or in the next cycle (FFY2016)
- The January 2015 DMR report indicated approximately 30% of the active ISW GP universe did not submit a DMR report for the reporting period of July 2014 through December 2014

ISWGP BASIC REQUIRMENTS

- Chesapeake Bay TMDL Monitoring
 - All Bay watershed facilities
 - TSS, TN and TP semiannual for 2 years (4 samples)
 - Permittee must calculate load
 - No net increase for future sites/expansions

Stormwater SAG Membership

Philip I. Abraham, Commercial Real Estate	Chris Pomeroy, Aqua Law
Bart Thrasher, VDOT/John Olenik (alt)	Katie Frazier, Va. Agribusiness
Peggy L. Sanner, Chesapeake Bay Fidin	Austin R. Mitchell, Amherst County
Michael L. Toalson, Home Builders	Jimmy Edmonds, Loudoun County
Adrienne Kotula, James River Association	Ann Ciernain, Paciulli Simmons
Rick Parrish, concerned citizen	Douglas Belsch, Stantec
Larry J. Land, VACO	Lewis Lawrence, MPPDC
Joe Lereh, VML	Jimmy Filson, Dewberry
Whitney Katchmark, HRPDC	Elizabeth A. Andrews, DEQ
L. Eldon James, Jr., Rappahannock River	Melanie Davenport, DEQ
	James Golden, DEQ
	Mark L. Rubin, Facilitator

Streamlining the Stormwater Law

- DEQ is committed to working to make the underlying statutes clear and easy to interpret
- A Stakeholder Advisory Group (SAG) has been formed to assist –examining Virginia Stormwater Management Act, Erosion & Sedimentation Control Law, Chesapeake Bay Preservation Act and State Water Control Law
- SAG members represent local governments, engineers, conservation groups, and permittees

2015 LEGISLATIVE STUDY

- Stormwater Regulations – Impact on High Water Table
- DEQ to conduct two year study on post construction technical criteria in areas with seasonal high ground water table
- Evaluate existing BMP design specifications
- Recommend revisions to allow effective use of these BMPs

Questions?

Melanie D. Davenport
Division of Water Permitting
Melanie.Davenport@deq.virginia.gov

804-698-4038



Rappahannock River Basin
Summit 2015

Joseph Battiata

Rappahannock River Basin
Summit 2015

Jason Bellows

Lancaster County

Rappahannock River Basin
Summit 2015

Jeff Black

Caroline County Board of Supervisors

Rappahannock River Basin
Summit 2015

Julie Bolthouse

Piedmont Environmental Council

Rappahannock River Basin
Summit 2015

Evan Branosky

Department of Energy & Environment

Rappahannock River Basin
Summit 2015

Allan Brockenbrough

DEQ

Rappahannock River Basin
Summit 2015

Sara Carter

Cumberland County

Rappahannock River Basin
Summit 2015

Laura Cattell Noll

University of Virginia

Rappahannock River Basin
Summit 2015

Jamie Clapp

RRBC

Rappahannock River Basin
Summit 2015

Patrick Coady

Northern Virginia Conservation Trust

Rappahannock River Basin
Summit 2015

Mark Cole

Virginia House of Delegates

Rappahannock River Basin
Summit 2015

Michael Collins

Center for Natural Capital

Rappahannock River Basin
Summit 2015

Melanie Davenport

Department of Environmental Quality

Rappahannock River Basin
Summit 2015

Michelle Edwards

Rappahannock-Rapidan Regional
Commission

Rappahannock River Basin
Summit 2015

David Ek

Fauquier County

Rappahannock River Basin
Summit 2015

T. Richard English

Richmond County

Rappahannock River Basin
Summit 2015

Matthew Espie

District Department of Energy and
Environment

Rappahannock River Basin
Summit 2015

Gregory Evans

Virginia Department of Forestry

Rappahannock River Basin
Summit 2015

Rob Ferrell

Virginia Department of Forestry

Rappahannock River Basin
Summit 2015

Virginia Frediani

Virginia Environmental Endowment

Rappahannock River Basin
Summit 2015

Nancy Frost

Master Naturalist, Old Rag Chapter

Rappahannock River Basin
Summit 2015

Normand Goulet

NVRC

Rappahannock River Basin
Summit 2015

Joseph Grzeika

King George Board of Supervisors

Rappahannock River Basin
Summit 2015

Emmett Hanger

Senate of Virginia

Rappahannock River Basin
Summit 2015

Rebecca Hanmer

Friends of the Rappahannock

Rappahannock River Basin
Summit 2015

Kathleen Harrigan

Friends of the Rappahannock

Rappahannock River Basin
Summit 2015

Mark Hockley

PA Department of Conservation and Natural Resources
Bureau of Forestry

Rappahannock River Basin
Summit 2015

Keith Hodges

House of Delegates - 98th District

Rappahannock River Basin
Summit 2015

Paul Howard

County of Culpeper

Rappahannock River Basin
Summit 2015

Steve Hubble

Stafford County

Rappahannock River Basin
Summit 2015

W. W. Hynson

County of Westmoreland

Rappahannock River Basin
Summit 2015

Richard Jacobs

Culpeper Soil and Water Conservation
District

Rappahannock River Basin
Summit 2015

Eldon James

RRBC

Rappahannock River Basin
Summit 2015

Martina James

Bellatrix Consulting Group

Rappahannock River Basin
Summit 2015

Eldon James, 3d

RRBC

Rappahannock River Basin
Summit 2015

Ann Jennings

Chesapeake Bay Commission

Rappahannock River Basin
Summit 2015

Samuel Johnson

Northern Neck SWCD

Rappahannock River Basin
Summit 2015

Larry Land

Virginia Association of Counties

Rappahannock River Basin
Summit 2015

Lewis Lawrence

Middle Peninsula Planning District
Commission

Rappahannock River Basin
Summit 2015

Scott Lingamfelter

Virginia House of Delegates

Rappahannock River Basin
Summit 2015

Pamela Mason

Virginia Institute of Marine Science

Rappahannock River Basin
Summit 2015

Kevin McGhee

Madison County

Rappahannock River Basin
Summit 2015

Stuart McKenzie

Northern Neck Planning District
Commission

Rappahannock River Basin
Summit 2015

Leslie Middleton

Bay Journal

Rappahannock River Basin
Summit 2015

Jack Miller

Middlesex County Board of Supervisors

Rappahannock River Basin
Summit 2015

Tim Mize

VCE

Rappahannock River Basin
Summit 2015

Steve Nixon

County of Culpeper

Rappahannock River Basin
Summit 2015

David Nunnally

Caroline County Dept of Planning

Rappahannock River Basin
Summit 2015

Tom O'Halloran

Culpeper SWCD

Rappahannock River Basin
Summit 2015

Reese Peck

Essex County

Rappahannock River Basin
Summit 2015

David Perdue

Rappahannock River Basin
Summit 2015

Tuana Phillips

Chesapeake Research Consortium

Rappahannock River Basin
Summit 2015

Doug Pickford

Conservation Concepts, LLC

Rappahannock River Basin
Summit 2015

Ross Pickford

Conservation Concepts

Rappahannock River Basin
Summit 2015

Joel Pinnix

Obsidian Onsite Services

Rappahannock River Basin
Summit 2015

Christopher Pomeroy

AquaLaw PLC

Rappahannock River Basin
Summit 2015

Mike Randall

NC DEMLR

Rappahannock River Basin
Summit 2015

Margaret Ransone

House of Delegates

Rappahannock River Basin
Summit 2015

Angela Redwine

Virginia Department of Health

Rappahannock River Basin
Summit 2015

Bettina Ring

Virginia Department of Forestry

Rappahannock River Basin
Summit 2015

Jon Roller

Ecosystem Services, LLC

Rappahannock River Basin
Summit 2015

Peggy Sanner

Chesapeake Bay Foundation

Rappahannock River Basin
Summit 2015

Paul Santay

Stafford County

Rappahannock River Basin
Summit 2015

Mike Santucci

Virginia Department of Forestry

Rappahannock River Basin
Summit 2015

McGann Saphir

Hanover-Caroline SWCD

Rappahannock River Basin
Summit 2015

Ed Scott

House of Delegates

Rappahannock River Basin
Summit 2015

Su Ann Shupp

PA Department of Conservation and Natural Resources
Bureau of Forestry

Rappahannock River Basin
Summit 2015

Corey Simonpietri

ACF Environmental

Rappahannock River Basin
Summit 2015

Sean Simonpietri

Exact Stormwater

Rappahannock River Basin
Summit 2015

May Sligh

VA DEQ - NRO

Rappahannock River Basin
Summit 2015

Ryan Stewart

Northern Virginia Conservation Trust

Rappahannock River Basin
Summit 2015

Richard Street

Spotsylvania County-Zoning

Rappahannock River Basin
Summit 2015

Ann Swanson

Chesapeake Bay Commission

Rappahannock River Basin
Summit 2015

Troy Tignor

Spotsylvania County-Zoning

Rappahannock River Basin
Summit 2015

Kevin Utt

City of Fredericksburg

Rappahannock River Basin
Summit 2015

Amy Walker

DCR

Rappahannock River Basin
Summit 2015

Matt Walker

Middlesex County

Rappahannock River Basin
Summit 2015

Tim Ware

George Washington Regional
Commission

Rappahannock River Basin
Summit 2015

Erika Wettergreen

Marstel-Day LLC

Rappahannock River Basin
Summit 2015

James White

Orange County Board of Supervisors

Rappahannock River Basin
Summit 2015

Billy Withers

City of Fredericksburg

Rappahannock River Basin
Summit 2015

Rob Wittman

United States Congress