

Roanoke River TMDL Implementation Plan Part I

Steering Committee Meeting

April 20th, 2015

1:30pm-4:00pm

DEQ Roanoke Office



Meeting Agenda

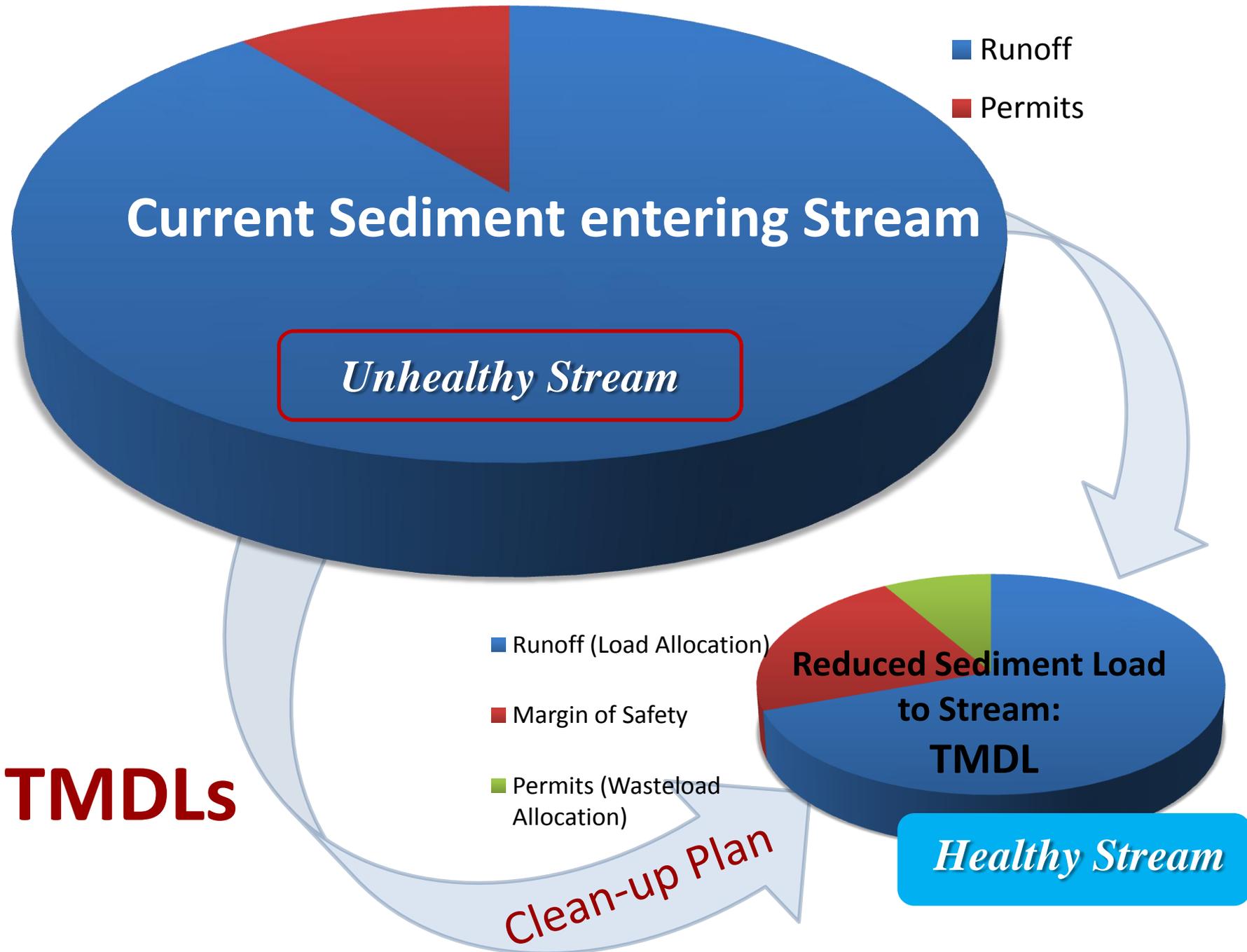
1. WELCOME, Introductions and Meeting Guidelines
2. April 30, 2015 Public Meeting Summary
3. TMDL and Clean-up/TMDL Implementation Plan Process
4. Highlights from Clean-up Plan (see presentation agenda for topics)
5. Questions/Comments

Presentation Agenda

- a) TMDL and Clean-up Plan Process
- b) IP Staging and Milestones
- c) IP Action Targeting
- d) Technical Assistance
- e) IP Tracking
- f) IP Monitoring
- g) Stakeholder Roles/Responsibilities
- h) Other Watershed Plans
- i) Legal Authority
- j) Funding Sources

TMDL/Clean-up Plan Process: The Big Picture





Public Participation

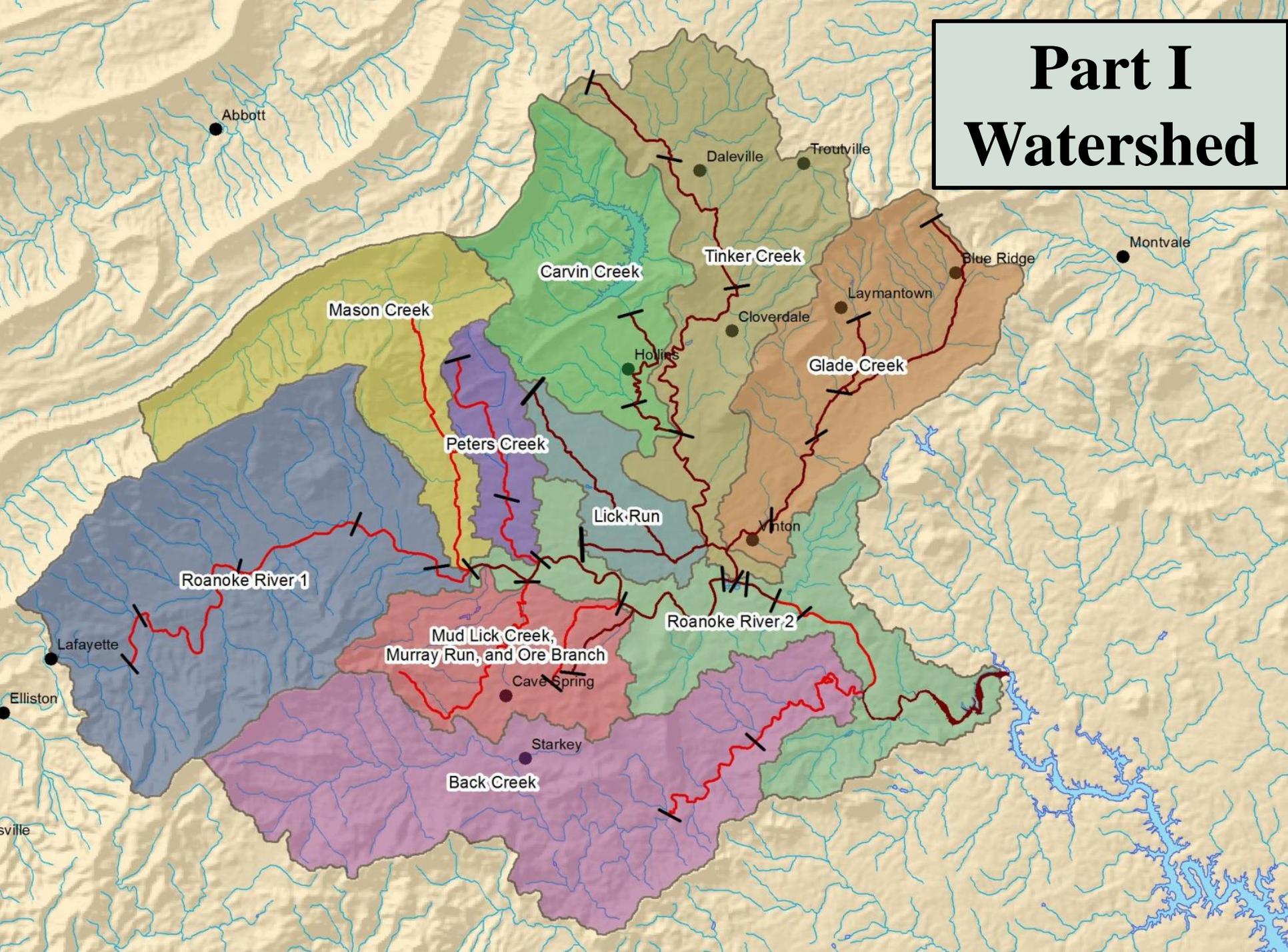
Meeting Date	Meeting Type	# of Attendees
April 10, 2013	Steering Committee	27
June 13, 2013	Open House - IP Kick-off	57
June 20, 2013	Agricultural & Residential Working Group	17
	Business Working Group	15
August 27, 2013	Government Working Group	20
November 21, 2013	Steering Committee	32
February 27, 2014	Agricultural & Residential Working Group	14
	Business Working Group	13
February 28, 2014	Government Working Group	26
August 20, 2014	Steering Committee	28
April 20, 2015	Steering Committee	—
April 30, 2015	Public Meeting - Part I Final, Part II Kick-off	—

Adaptive Implementation Approach

Overarching Project Goal is to Design a Clean-up Plan including:

- Appropriate types and numbers of Best Management Practices designed to meet sediment and bacteria reduction allocations from Roanoke River TMDLs
- Measurable Goals and Milestones for achieving water quality goals
- List and description of potential funding sources
- **Meeting Goals:** Discuss staging of IP actions, technical assistance, BMP tracking, monitoring, stakeholder roles/responsibilities, other watershed plans, and funding sources.

Part I Watershed



IP Staging and Milestones

- Progress in implementation plans is measured by two milestones: **implementation milestones** and **water quality milestones**
 - **Implementation milestones:** Establish amount of control measures installed within prescribed timeframes.
 - **Water quality milestones:** Establish corresponding improvements in water quality that can be expected as the implementation milestones are met.
- The implementation of control measures proposed will take place over three stages across a 15 to 20 year plan timeline.
 - 15 Year Timeline – Subwatersheds of *Carvin Creek, Peters Creek, Mason Creek, and Back Creek* (smaller and/or more rural)
 - Stage I - Years 1 to 6
 - Stage II - Years 7 to 12
 - Stage III - Years 13 to 15
 - 20 Year Timeline – Subwatersheds of *Glade Creek, Tinker Creek, Lick Run, Mud Lick/Murray/Ore Branch, Roanoke River 1 and Roanoke River 2* (larger and/or more urbanized)
 - Stage I - Years 1 to 8
 - Stage II - Years 9 to 16
 - Stage III - Years 17 to 20

IP Staging and Milestones

- Typical strategy is to:
 - Implement the cost-effective BMPs in the first stage.
 - Monitor water quality
 - Implement the more challenging BMPs in the second and third stages (bacteria de-listing and meeting TMDL loads).
- Water Quality Milestones and Delisting Segments
 - Timeline
 - BMPs distributed by stage
 - Model water quality improvements using HSPF model (bacteria) or mass loading calculations (sediment).
 - The delisting goal is achieved for *Carvin Creek, Back Creek, Lick Run, and Roanoke River 2* in Stage II.
 - The delisting goal is achieved for the remaining subwatersheds in Stage III.

Implementation Plan Staging

Glade Creek Implementation Staging				
Best Management Practice	Unit	Stage I (Y1-Y8)*	Stage II (Y9-Y16)*	Stage III (Y17-Y20)*
Residential BMPs				
Septic System Pump-Out (RB-1)	Pump Out	448	597	-
Sewer Connection (RB-2)	System	133	265	-
Repaired Septic System (RB-3)	System	383	511	-
Septic System Installation/Replacement (RB-4)	System	322	429	-
Alternative Waste Treatment System Installation (RB-5)	System	34	45	-
Pet Waste Management Education Program	Program	Program	Program	Program
Pet Waste Station	Unit	5	6	-
Total Cost		\$5,267,085	\$2,598,195	\$5,000
Existing BMPs and Detention Pond Retrofits				
Infiltration Trench	System	17	22	-
Constructed Wetlands	System	23	31	-
Street Sweeping (additional miles to be swept annually)**	Miles Swept	325	325	325
Total Cost		\$4,502,395	\$2,402,745	\$676,460
Stormwater BMPs				
Bioretention	Acre Treated	221.3	796.5	885.0
Rain Gardens	Acre Treated	88.5	159.3	177.0
Infiltration Trench	Acre Treated	44.0	158.4	176.0
Manufactured BMPs	Acre Treated	107.0	192.6	214.0
Constructed Wetland	Acre Treated	1,003.3	3,611.7	4,013.0
Detention Pond	Acre Treated	49.0	176.4	196.0
Permeable Paver	Acre Treated	1.3	3.8	5.0
Vegetated Swale	Acre Treated	37.5	135.0	150.0
Rain Barrel	System	123	245	-
Riparian Buffer: Forest	Acre Installed	12.0	16.0	-
Riparian Buffer: Grass/Shrub	Acre Installed	12.0	16.0	-
Urban Tree Canopy/Landuse Conversion	Acre Converted	7.5	27.0	30.0
Total Cost		\$9,226,195	\$19,025,215	\$3,328,100

Implementation Plan Staging

Glade Creek Implementation Staging				
Best Management Practice	Unit	Stage I (Y1-Y8)*	Stage II (Y9-Y16)*	Stage III (Y17-Y20)*
Cropland BMPs				
Continuous No-Till (SL-15)	Acre Installed	50.0	-	-
Small Grain Cover Crop (SL-8)	Acre Installed	45.0	-	-
Permanent vegetative cover on cropland (SL-1)	Acre Installed	3.0	-	-
Sod Waterway (WP-3)	Acre Installed	7.0	-	-
Cropland Buffer/Field Borders (CP-33 and WQ-1)	Acre Installed	3.0	-	-
Total Cost		\$21,075	\$0	\$0
Livestock Exclusion Systems and Manure Management				
Livestock Exclusion (CRSL-6)	System	3	4	-
Livestock Exclusion (SL-6T/LE1-T)	System	41	55	-
Livestock Exclusion with Reduced Setback (LE-2T)	System	3	6	-
Small Acreage Grazing System (SL-6AT)	System	3	-	-
Stream Protection/Fencing (WP-2T)	System	2	-	-
Manure Storage (WP-4)	System	2	-	-
Total Cost		\$1,183,250	\$366,750	\$0
Pasture BMPs				
Reforestation of Erodible Pasture (FR-1)	Acre Installed	201.0	402.0	-
Pasture Management (EQIP 528, SL-10T, SL-9)	Acre Installed	1809.0	3618.0	-
Vegetative Cover on Critical Areas (SL-11)	Acre Installed	362.0	724.0	-
Total Cost		\$682,635	\$682,635	\$0
Stream Restoration				
Stream Restoration	Feet	7,098	-	-
Total Cost		\$2,129,400	\$0	\$0
Total Cost Per Stage		\$23,012,035	\$25,075,540	\$4,009,560
Percent Exceedance Geometric Mean (126 cfu/100 mL)		51.0%	17.7%	0.0%
Percent Exceedance Single Sample Maximum (235 cfu/100mL)		40.3%	28.3%	9.7%
Bacteria Load Per Stage (cfu/year)		3.06E+13	1.11E+13	3.11E+12
*Numbers represent cumulative total of BMPs implemented				
**Not cumulative, represented annually				

Bacteria Water Quality Milestones

Water Quality Milestones - Bacteria Criteria Exceedances and Average Annual E. coli Load (cfu/yr) per IP stage

Stage	Exceedance Criteria	Back Creek	Carvin Creek	Glade Creek	Lick Run	Mason Creek	Mud Lick Creek, Murray Run, Ore Branch	Peters Creek	Roanoke River 1	Roanoke River 2	Tinker Creek
Stage I	% Exceedance Single Sample Maximum (235 cfu/100 mL)	22%	18%	40%	16%	23%	20%	23%	18%	14%	34%
Stage II	% Exceedance Single Sample Maximum (235 cfu/100 mL)	11%	15%	28%	14%	21%	19%	21%	18%	11%	25%
Stage III	% Exceedance Single Sample Maximum (235 cfu/100 mL)	10%	10%	10%	10%	10%	19%	10%	18%	10%	10%

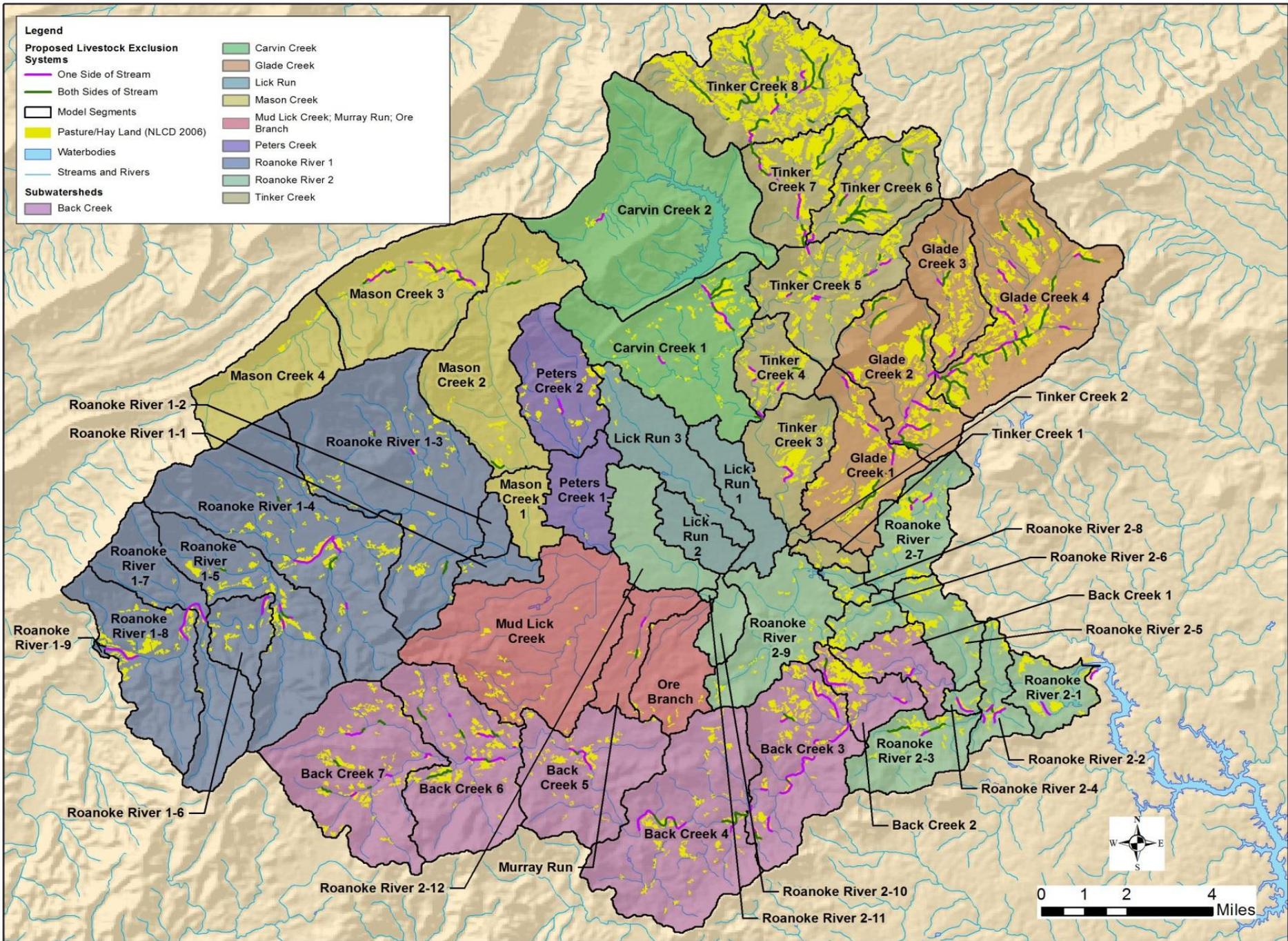
Sediment Water Quality Milestones

Water Quality Milestones - Cumulative Sediment Reductions by IP Stage (tons/year) and Percentage Attainment of TMDL Goal			
Subwatershed	Stage I	Stage II	Stage III
Carvin Creek	1,392	2,494	2,514
Glade Creek	2,310	2,616	2,655
Lick Run	988	1,255	1,298
Mason Creek	1,189	2,136	2,159
Mud Lick, Murray Run, and Ore Branch	1,862	2,196	2,247
Peters Creek	746	896	920
Roanoke River 1	2,726	4,813	4,864
Roanoke River 2	1,428	1,787	1,842
Tinker Creek	1,781	3,371	3,425
Total	14,422	21,564	21,924
Percent of TMDL Reductions Attained	73%	100%	100%

*The benthic TMDL is estimated to be attained in the 13th year of the 20 year TMDL IP timeline.

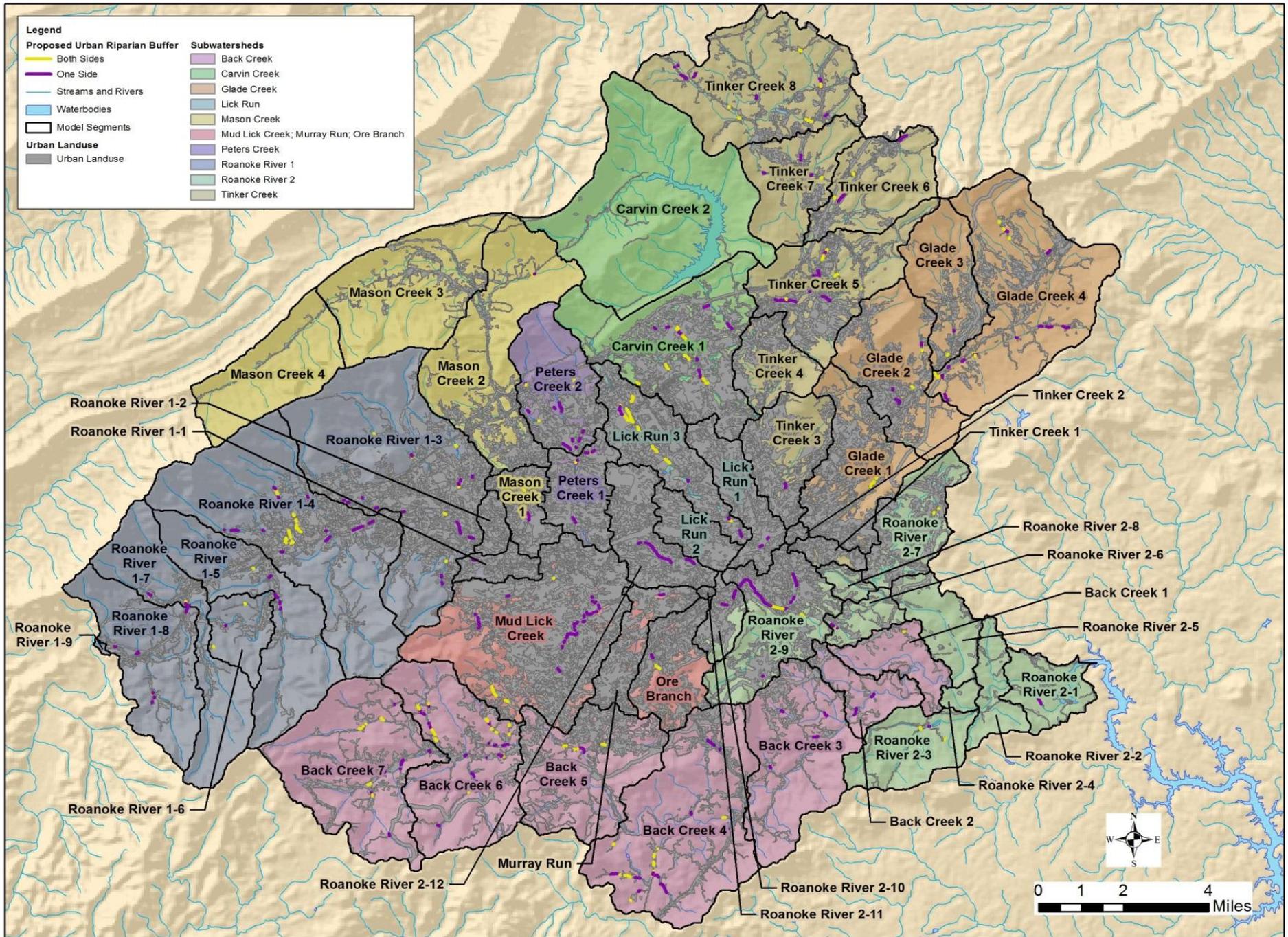
IP Action Targeting

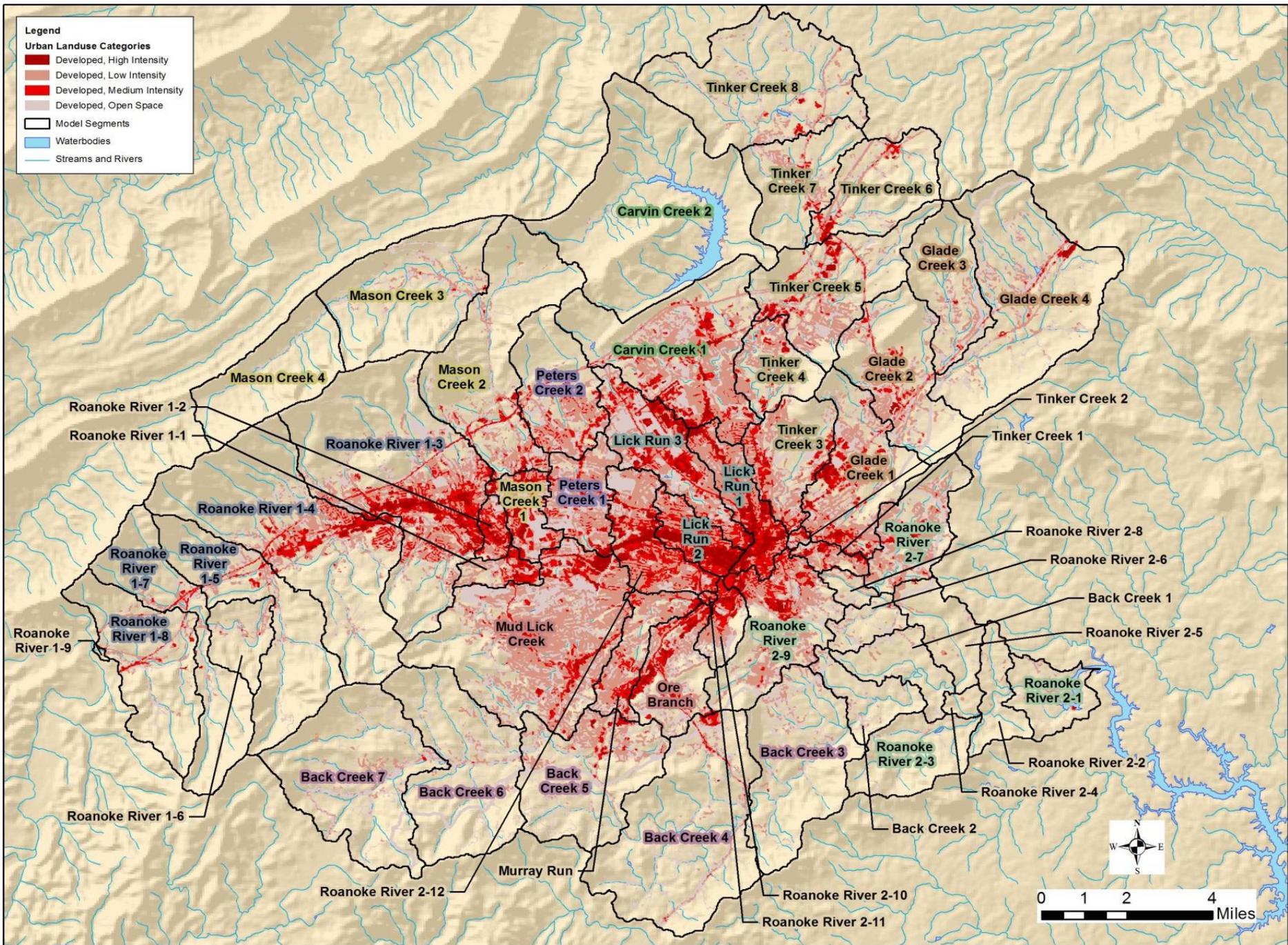
- Watershed was split up into smaller areas for modeling purposes (subwatershed)
- These model segments can be intersected with certain types of data to focus, or target, implementation actions on a more local level.
 - Will help localities focus resources in a more effective manner
- This plan has ranked subwatersheds on the opportunity for BMP implementation in the following areas:
 - On-Site Sewage Disposal Practices & Sewer Connections
 - Livestock Exclusion Systems (spatially targeted)
 - Urban Riparian Buffers (spatially targeted)
 - Density of Urban Areas (stormwater runoff/pollutants)



Legend

Proposed Urban Riparian Buffer	Subwatersheds
— Both Sides	Back Creek
— One Side	Carvin Creek
— Streams and Rivers	Glade Creek
— Waterbodies	Lick Run
— Model Segments	Mason Creek
— Urban Landuse	Mud Lick Creek; Murray Run; Ore Branch
— Urban Landuse	Peters Creek
	Roanoke River 1
	Roanoke River 2
	Tinker Creek





Technical Assistance

- Technical assistance will be needed for the Public for implementing BMPs proposed in the Implementation Plan
 - Residential Waste Treatment BMPs
 - Outreach and implementation of septic system practices and sewer connections. Tracking of BMP implementation.
 - Agricultural BMPs
 - via Blue Ridge and Mountain Castles SWCDs
 - Landowner outreach, educational materials, administer cost-share practices, and assess progress towards BMP implementation goals
 - Non-MS4 Stormwater BMPs
 - Design/siting of non-MS4 stormwater BMPs, educational materials, outreach, and tracking of BMP implementation progress
 - Roanoke and Botetourt Counties urban areas outside of MS4 boundaries
 - Majority of developed land outside of the Urban Census Layer/MS4 boundary is roads many of which are covered under VDOT's MS4

Technical Assistance

- Technical assistance is quantified by estimating Full Time Equivalents (FTEs) needed by local programs to provide additional assistance beyond usual capacity
- This plan will address technical assistance related to:
 - Residential Waste Treatment BMPs - Two FTEs
 - Agricultural BMPs
 - 1 FTE for Mountain Castles SWCD
 - 0.5 FTE for Blue Ridge SWCD
 - Non-MS4 Stormwater BMPs – 1.5 FTE
 - This will apply to Roanoke and Botetourt Counties since there are urban areas there outside of MS4 boundaries (1 FTE – Roanoke, ½ FTE Botetourt)

Technical Assistance

Full Time Equivalent Positions by IP Stage & BMP Category

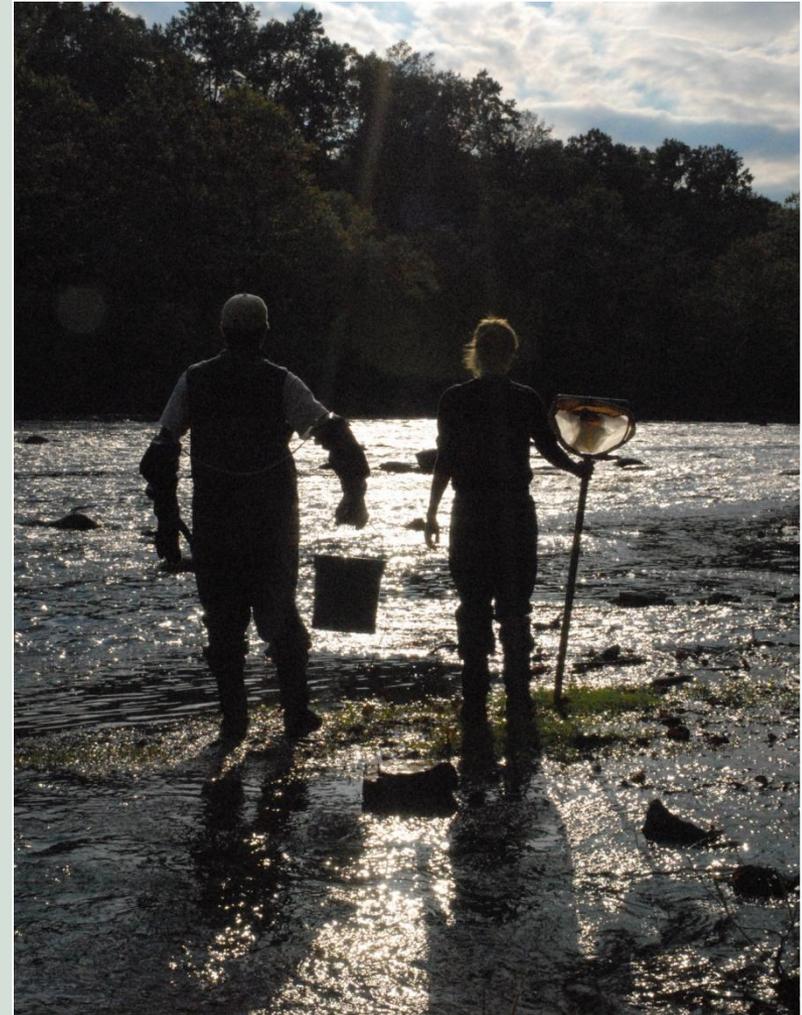
Type of IP Actions	Stage 1 (Year 1-8)	Stage 2 (Year 9-16)	Stage 3 (Year 17-20)
Agricultural	1.5	1	0.5
Residential	2	2	1
Non-MS4 Urban	1.5	1.5	1

Implementation Plan Tracking

- Plans requires tracking of the implementation of BMPs to assess progress towards IP goals and water quality milestones
 - Preparing inventory of BMP locations and extent, documentation of outreach educational activities
- IP tracking has similar categories and overlap with technical assistance
 - Residential BMP Tracking – **To be determined**
 - Could be tracked by a combination of municipalities, VDH, and other stakeholders (e.g. grant funding reporting requirements)
 - Agricultural BMP Tracking
 - Will be tracked by Soil and Water Conservation Districts
 - Non-MS4 Stormwater BMP Tracking – **To be determined**
 - Could be integrated with the municipalities tracking of their BMPs to meet MS4 Wasteload Allocations
- Subset of the IP steering committee may want to reconvene and collaborate on implementation tracking at key points throughout the implementation timeline.

Implementation Plan Monitoring

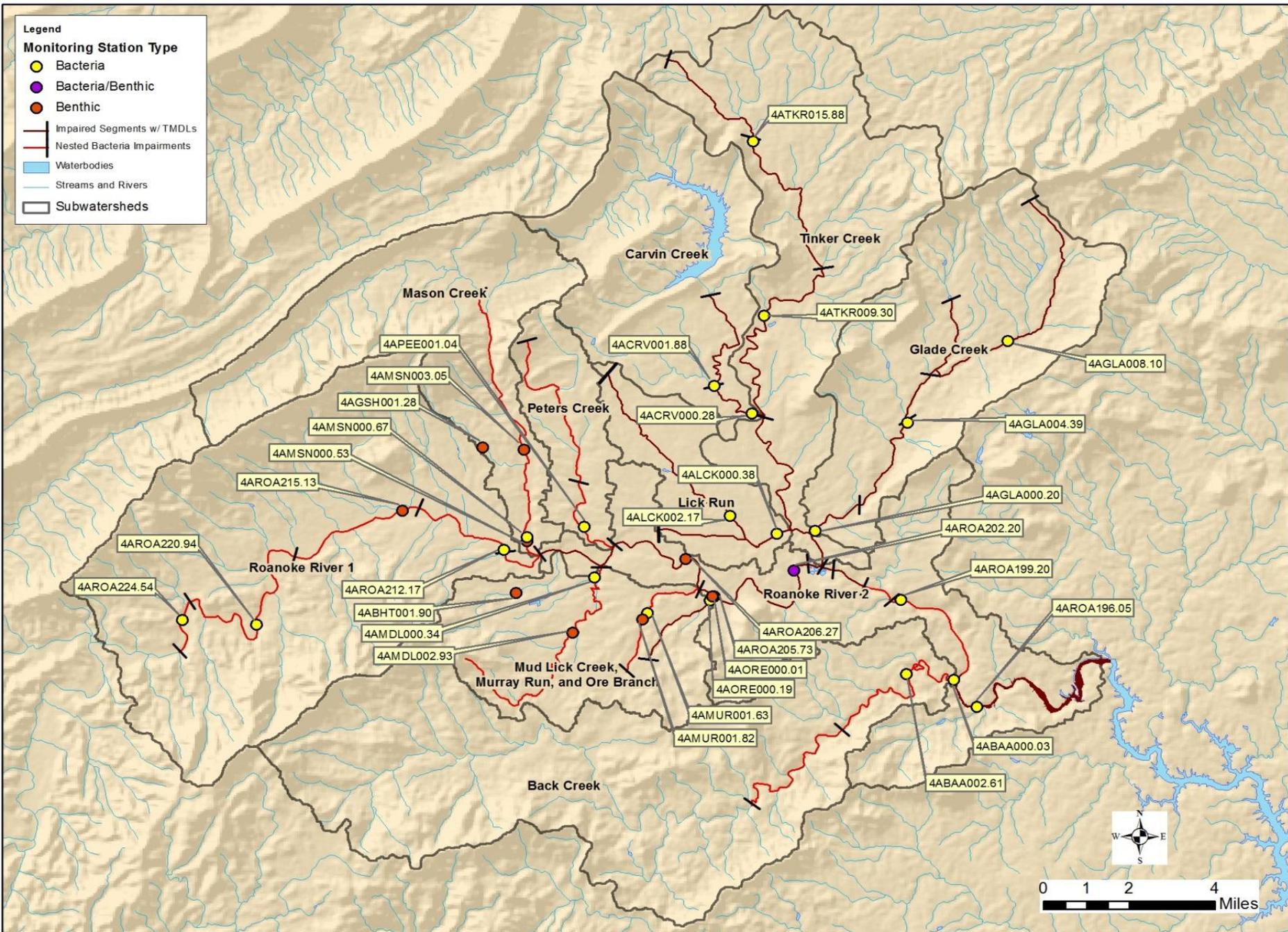
- Purpose:
 - To evaluate progress toward meeting water quality milestones
 - Gage water quality improvement from BMP installation
 - De-listing of impaired segments!
- Approach:
 - Original impairment listing stations
 - Subsequent impairment listing stations
 - Bimonthly - water chemistry stations,
 - Spring & Fall - benthic macroinvertebrate stations
- When does IP monitoring start?
 - After at least 2 years of BMP installation has occurred
 - Based on key stakeholder input



Legend

Monitoring Station Type

- Bacteria
- Bacteria/Benthic
- Benthic
- Impaired Segments w/ TMDLs
- Nested Bacteria Impairments
- Waterbodies
- Streams and Rivers
- Subwatersheds



Stakeholder Roles/Responsibilities

- Federal Government

- *Environmental Protection Agency (EPA)* – Oversight of Clean Water Act programs
- *Natural Resources Conservation Service (NRCS)* – Assist landowners with conservation of soil, water and other natural resources; major funding stakeholder.

- State Government

- *Virginia Department of Environmental Quality (VADEQ)* – Lead agency in TMDL process. Administers TMDL and IP process, provides grant funding and technical support for IP, works with stakeholders to track IP progress
- *Virginia Department of Conservation and Recreation (VADCR)* – Administers VA Ag Cost Share Program and Nutrient Management Program
- *Virginia Department of Agriculture and Consumer Services (VDACS)* - Administers the Agricultural Stewardship Act and review of claims of agricultural pollution
- *Virginia Department of Health (VDH)* - Responsible for adopting and implementing regulations for onsite wastewater treatment and disposal

Stakeholder Roles/Responsibilities

- State Government (continued)

- *Virginia Department of Forestry (VDOT)* - Water quality inspectors assist loggers and landowners with timber harvest planning/execution and encourage the use of specific voluntary BMPs to keep streams free of silvicultural sediments.
- *Virginia Cooperative Extension (VCE)* - Educational outreach program of Virginia's land grant universities (Virginia Tech and Virginia State University), and a part of the national Cooperative State Research, Education, and Extension Service, an agency of the U.S. Department of Agriculture.
- *Virginia Department of Transportation (VDOT)* – Are responsible for maintaining major roads. Is an MS4 permittee who will prepare a MS4 TMDL action plan to help address sediment and bacteria pollution from roadways.

- Local Government

- *Soil and Water Conservation Districts (SWCDs)* - Local units of government responsible for the soil and water conservation work. Role is to increase voluntary conservation practices among farmers, ranchers and other land users.
- *Planning District Commissions (PDCs)* - Focus much of their efforts on water quality planning, which is complementary to the TMDL process.
- *County/City Government Departments* - City and county government staff work closely with PDCs and state agencies to develop and implement TMDLs.

Local Stakeholders

- Community Watershed and Conservation Groups
 - Blue Ridge Land Conservancy (BRLC)
 - Glade Creek Restoration Committee
 - Roanoke Valley Greenways
 - Trout Unlimited (TU)
 - Upper Roanoke River Roundtable (URRR)
 - Friends of the Rivers of Virginia (FORVA)
 - Impact+Amplify
- Community Civic Groups
 - Clean Valley Council (CVC)
 - Mill Mountain Garden Club
 - Smith Mountain Lake Association (SMLA)
- Citizens and Businesses
 - Roanoke Region Chamber of Commerce
 - Southeast Rural Community Assistance Project, Inc. (SERCAP)
 - Williamson Road Area Business Association, Inc.
 - Orvis

Other Watershed Initiatives that Support IP Goals

- **Livable Roanoke Valley**
 - Holds a goal to work collaboratively to preserve the natural assets of the region which includes the strategy of improving air and water quality. Actions to support this strategy include the development of stormwater banking systems and the restoration and maintenance of stream buffers along critical waterways.

- **Upper Roanoke River Roundtable**
 - Supports numerous projects including education and outreach activities, riparian plantings, clean-up activities, citizen stream monitoring, and pet waste stations.

- **Roanoke Valley Greenways**
 - Citizen initiative to improve quality of life in the region. Since 1995 has provided 26 miles of greenways with bicycle/pedestrian paths. Pet waste stations installed in many locations. BMPs implemented in parking lots. Good opportunities for outreach.

- **Roanoke River Blueway**
 - 45 mile water trail with access to local waterways; holds a goal of educating public about the importance of watershed and water resources

Other Watershed Initiatives that Support IP Goals

- Western VA Water Authority
 - Offers outreach classroom presentations and facility tours to citizens and local groups. Will maintain sewer system and work with stakeholders to connect to sewer when septic systems fail.
- Local Comprehensive Plans (Botetourt, Roanoke City/County, Salem)
 - Plans outline objectives to improve water quality by expanding riparian zones, implementing stormwater management programs, ensuring compliance with erosion and sediment control plans, and land use management
- MS4 TMDL Action Plans
 - In preparing local TMDL action plans, MS4 permittees can use the Roanoke River IP as a resource for action plan development. However, the IP does not provide prescriptive actions for the localities to employ in order to meet their MS4 requirements.

Legal Authority

- In accordance with the Virginia Stormwater Management Law and Virginia Erosion, Sediment Control Law, and HB1065, ordinances regulating stormwater management and erosion and sediment control are mandatory within the Roanoke River TMDL implementation study area
- Each locality has a stormwater pollution prevention plan which must include:
 - Stormwater Management Plan
 - Erosion and Sediment Control Plan
 - Pollution Prevention Plan
 - Best Management Practices to prevent and reduce stormwater related issues
- City of Roanoke has adopted a Stormwater Utility Ordinance in 2013 which created a Stormwater Utility Fee
 - All developed properties are subject to the fee
 - Reductions of the fee can be gained by installing and maintaining stormwater BMPs
- Ordinance creation is an avenue for compliance with proposed IP actions, however this IP is not prescribing any ordinance creation
 - Mandatory Septic Pump Outs
 - Mandatory Pet Waste Pick Up

Funding Sources

- Federal

- EPA Section 319 Funds
- USDA Programs – Conservation Reserve Program (CRP), Conservation Reserve Enhancement Program (CREP), Conservation Stewardship Program (CSP), Environmental Quality Incentives Program (EQIP)
- Agricultural Lands Easement Program
- United States Fish and Wildlife Service

- State

- Agricultural BMP Cost-Share Program
- Agricultural Best Management Practices Loan Program
- Agricultural Best Management Practices Tax Credit Program
- Clean Water Revolving Loan Fund
- Department of Environmental Quality Citizen Water Monitoring Grant Program
- VDOF
 - Urban and Community Forestry Assistance Program (U&CF)
 - Virginia Forest Stewardship Program

Funding Sources

- State (continued)
 - Virginia Outdoors Foundation (VOF)
 - Small Business Environmental Compliance Assistance Loan Fund
 - Stormwater Local Assistance Fund (SLAF)
 - Water Quality Improvement Fund

- Regional and Private
 - Community Development Block Grant (CDBG)
 - Foundation for Roanoke Valley
 - National Fish and Wildlife Foundation (NFWF)
 - Five Star and Urban Waters Restoration Grant Program
 - Southeast Rural Community Assistance Project (SERCAP)
 - Virginia Environmental Endowment
 - Wetland and Stream Mitigation Banking

Contacts



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Reports/presentations available at:

<http://www.deq.virginia.gov/Programs/Water/WaterQualityInformationTMDLs/TMDL/TMDLImplementation/TMDLImplementationProgress.aspx>



Louis Berger

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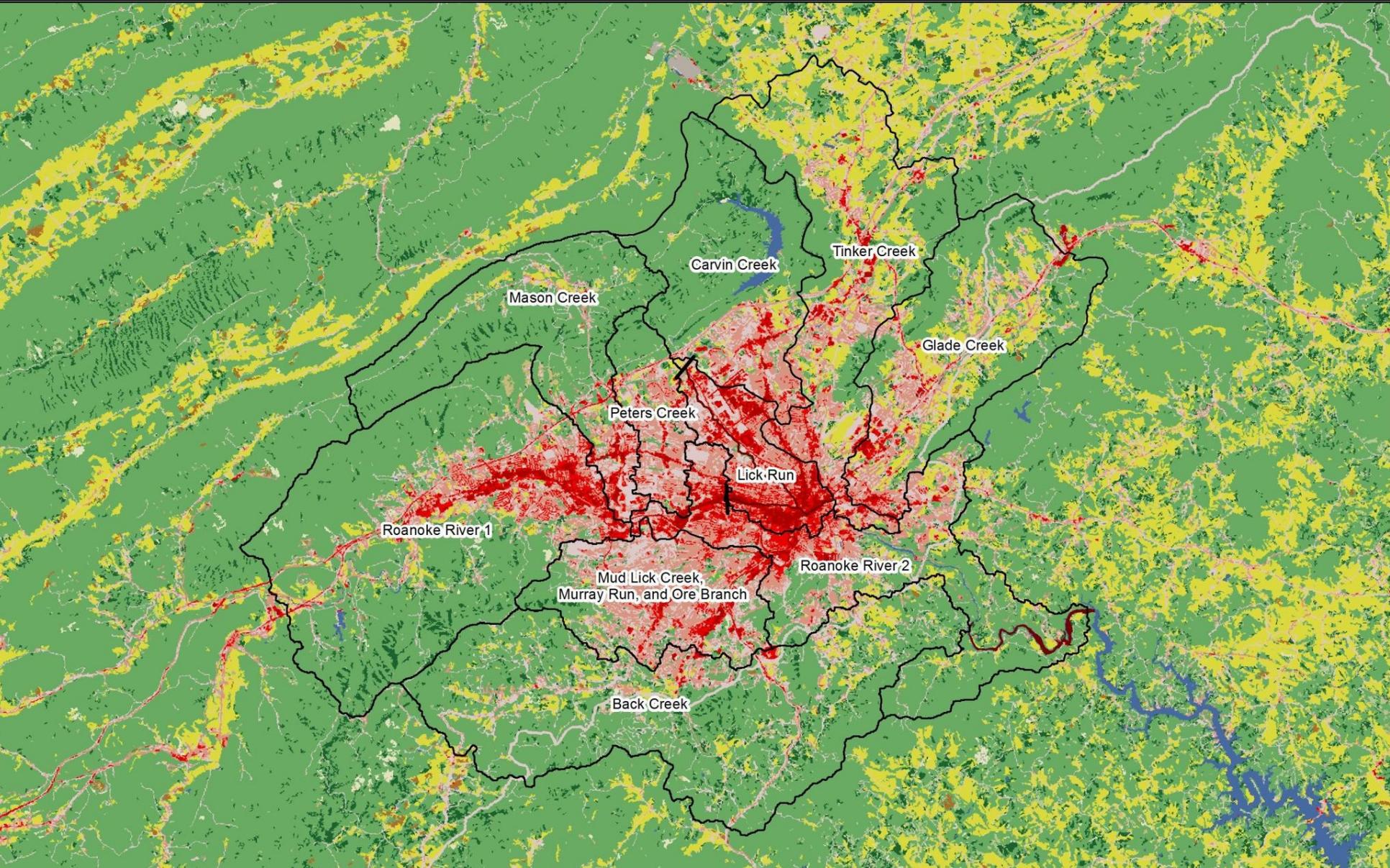
ntatalovich@louisberger.com

Questions / Comments



Additional Slides

NLCD 2006 Land Use



Roanoke River Watershed Allocations

TMDL Bacteria Reductions by Source

Source	Back Creek	Carvin Creek	Glade Creek	Lick Run	Mason Creek	Mud Lick Creek, Murray Run, and Ore Branch	Peters Creek	Roanoke River 1	Roanoke River 2	Tinker Creek
Developed	98.9%	90.2%	96.3%	98.5%	98.9%	99.6%	98.9%	96.5%	98.2%	98.6%
Cropland	98.9%	0.0%	96.3%	0.0%	98.9%	99.6%	0.0%	96.5%	98.2%	99.8%
Pasture/Hay	98.9%	90.2%	96.3%	91.0%	98.9%	99.6%	98.9%	96.5%	98.2%	99.8%
Forest	98.9%	85.2%	91.5%	0.0%	98.9%	99.6%	98.9%	96.5%	98.2%	95.0%
Water/Wetlands	0.0%	85.2%	91.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	95.0%
Other	98.9%	90.2%	96.3%	0.0%	98.9%	99.6%	98.9%	96.5%	98.2%	98.0%
Livestock Direct	100.0%	100.0%	100.0%	0.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Wildlife Direct	64.5%	75.0%	70.0%	0.0%	65.1%	87.9%	53.7%	67.1%	66.0%	0.0%
Failing Septic Systems	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Roanoke River TMDL Sediment Reductions

Landuse Category		Percent Reduction
Land Sources	Developed	75%
	Cropland	75%
	Pasture/Hay	75%
	Forest	75%
	Water/Wetlands	0%
	Other	75%
Instream Erosion	-	75%