

Banister River and Winn Creek TMDL Implementation Plan Development

First Public Meeting

**Mary Bethune Office Complex Halifax,
VA**

April 17th, 2014

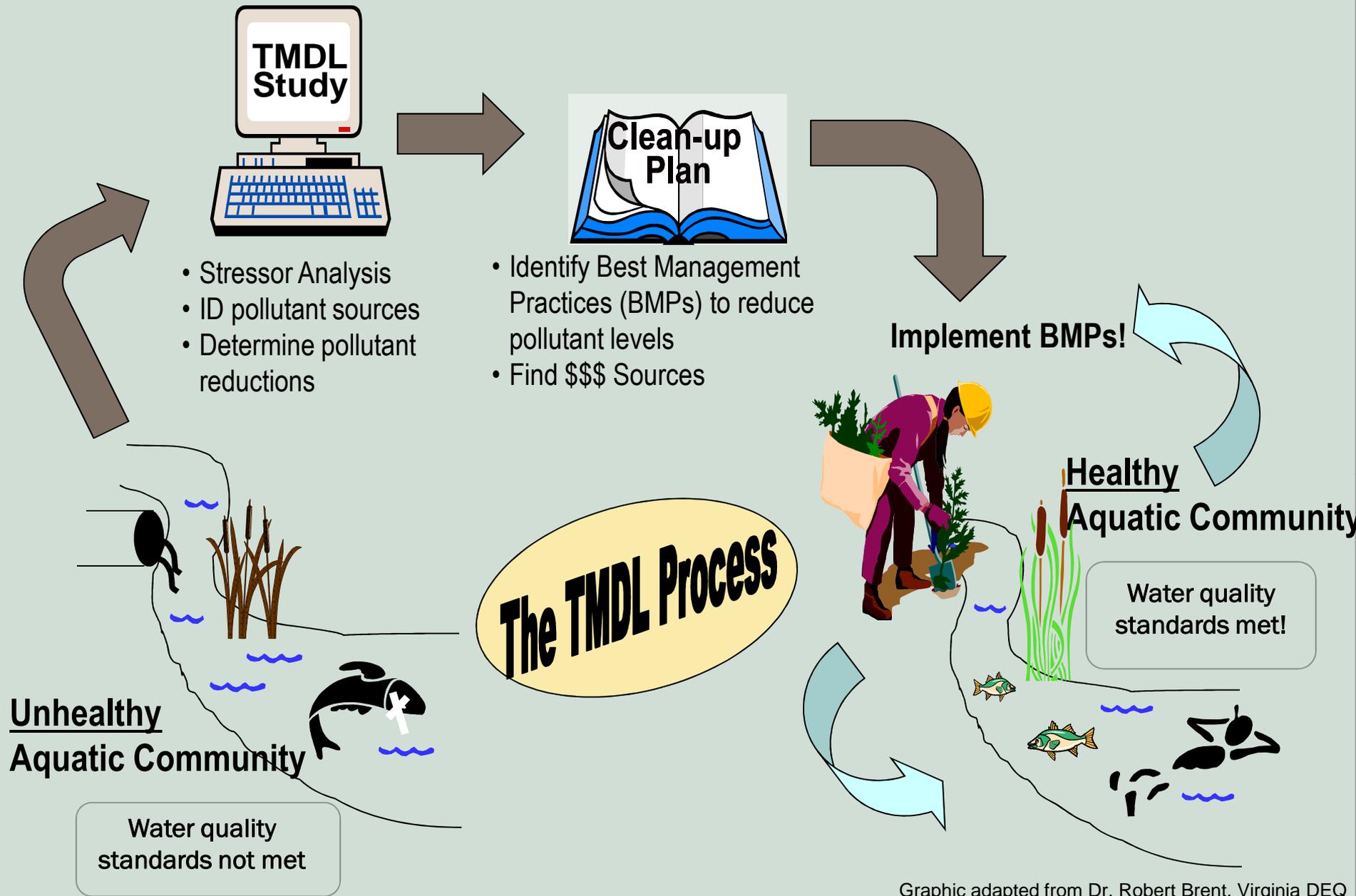


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Public Meeting Agenda

- **TMDL and Implementation Plan Process Overview**
- **TMDL Review**
 - **Impaired Segments**
 - **Watershed Characterization**
 - **Source Assessment**
 - **Modeling Approach**
 - **TMDL**
- **Public Participation Overview**
- **Implementation Plan Development Timeline**



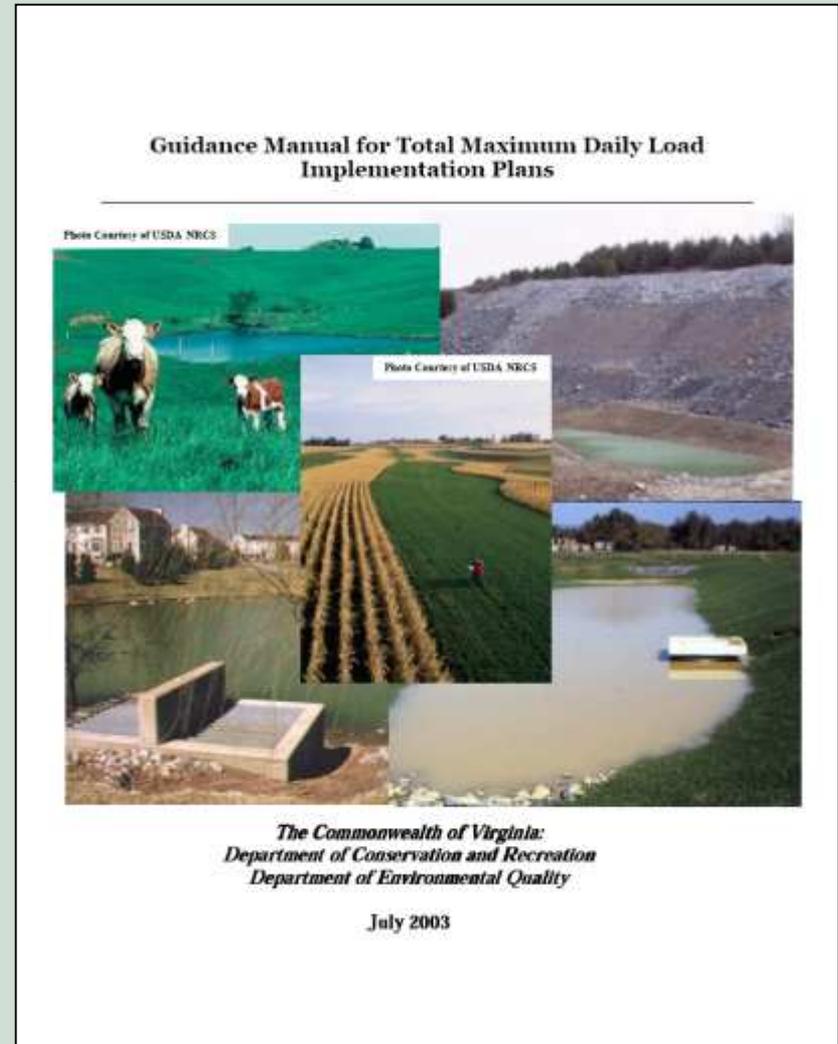
Graphic adapted from Dr. Robert Brent, Virginia DEQ

TMDL and Implementation Process

- Once a TMDL identifies **what** we need to do to attain WQS, an implementation plan **tells** us **how**.
- Implementation plans outline and provide guidance on the actions necessary to improve water quality within the impaired watershed.

TMDL Implementation Plans

- Required by state legislation
- Procedures for development of implementation plans outlined in the *Guidance Manual for TMDL Implementation Plans* developed by DCR and DEQ.



Implementation Plan Process

- Identify Existing Best Management Practices (BMPs) that reduce the pollutant of concern (bacteria)
- With stakeholder participation, propose BMPs to reduce bacteria to levels called for in TMDL
 - Plan will include cost estimates for BMPs
 - Plan will account for technical assistance in outreach, education, and helping landowners design and construct BMPs
- Analyze benefits of implementing BMPs

Implementation Plan Process (cont'd)

- Develop measureable goals and milestones
 - Both water quality and implementation milestones
 - Basis for staging the implementation plan actions
- Consider targeting strategies to maximize cost effectiveness
- Track BMP implementation and water quality improvement through surface water monitoring
- Research and suggest potential funding sources to assist BMP implementation

Banister River and Winn Creek TMDL Development

Relevant Water Quality Standards

VADEQ specifies the following criteria (9 VAC 25-260-170) for primary contact recreational uses in Class III (non-tidal) freshwater:

E. coli:

- **126 CFU*/100ml (geometric mean: applies to 4 or more samples obtained in 1 calendar month)**
- **235 CFU*/100mL (no more than 10% of the total samples shall exceed)**

***CFU = colony forming units**

If water quality standards are not being met, the waterbody is designated as impaired and in need of a TMDL.

What is a TMDL ?

Total Maximum Daily Load

$$\text{TMDL} = \text{Sum of WLA} + \text{Sum of LA} + \text{MOS}$$

Where:

TMDL = Total Maximum Daily Load

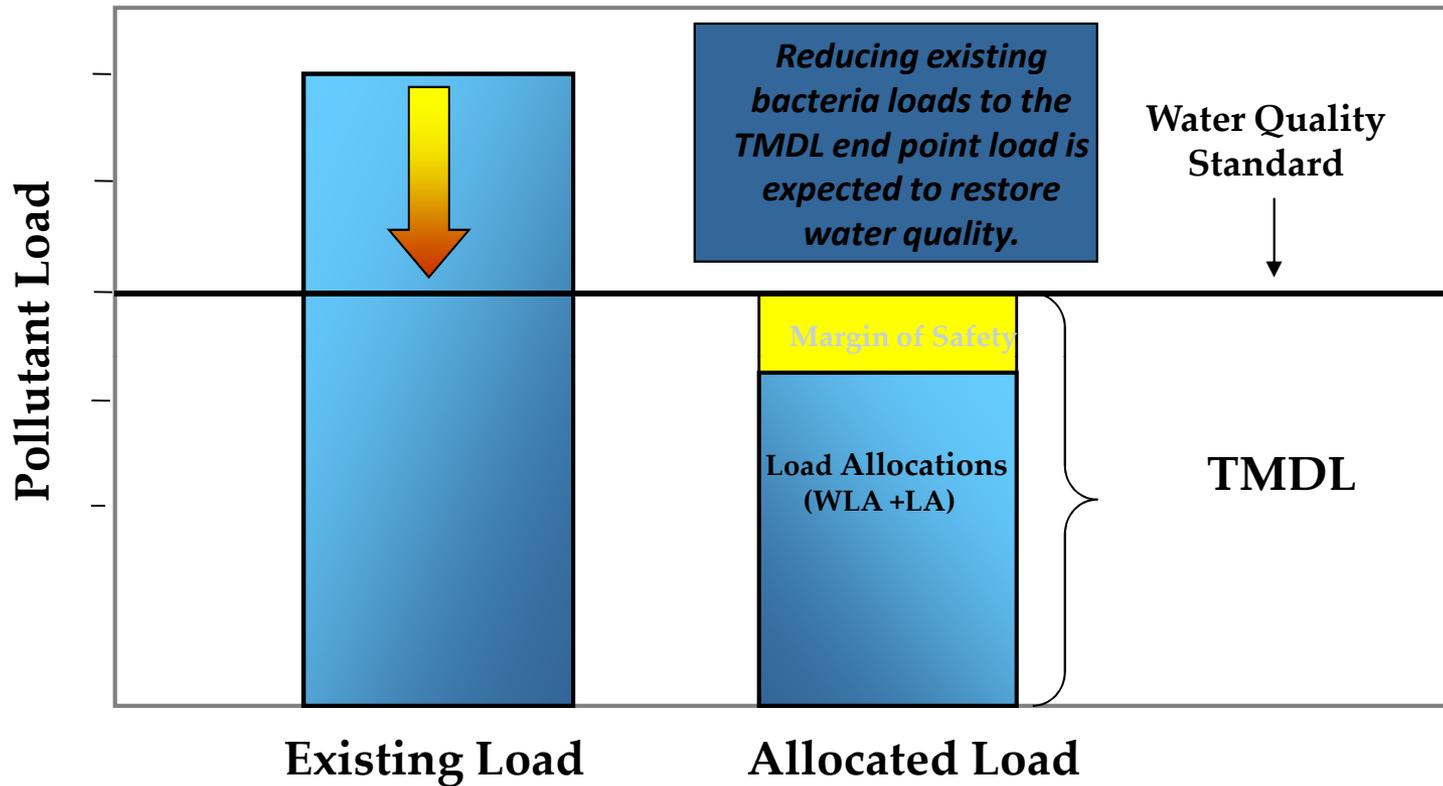
WLA = Waste Load Allocation (point sources)

LA = Load Allocation (non-point sources)

MOS = Margin of Safety

A TMDL is the maximum amount of a pollutant a water body can receive and still meet water quality standards.

An Example TMDL



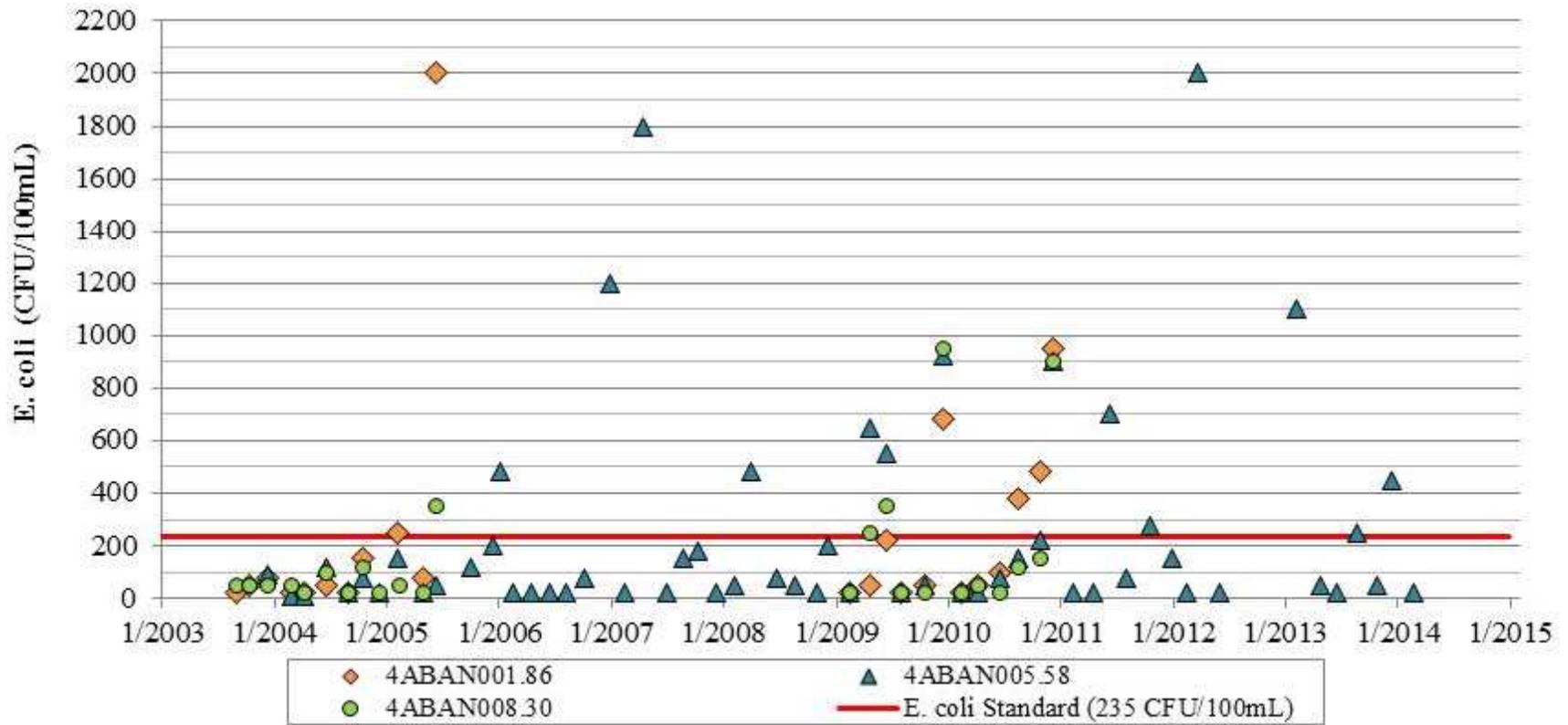
Impairment Overview

Impairments listed in the TMDL (2010 305(b)/303(d) Water Quality Assessment Integrated Report)						
Cause Group Code	Assessment Unit	Stream Name	Length (miles)	Boundaries	Listing Station ID:	Impairment
L71R-04-BAC	VAC-L71R_BAN06A08	Banister River	2.39	Confluence of Wolf Trap Creek to its mouth on the Dan River.	4-ABAN001.86	<i>E. coli</i>
L71R-06-BAC	VAC-L71R_WNN01A06	Winn Creek	6.94	Headwaters to the mouth on the Banister River.	4-AWNN000.99	<i>E. coli</i>

Additional Impairment Listed in the 2012 305(b)/303(d) Water Quality Assessment Integrated Report						
Cause Group Code	Assessment Unit	Stream Name	Length (miles)	Boundaries	Listing Station ID:	Impairment
L71R-04-BAC	VAC-L71R_BAN04A00	Banister River	1.39	Banister Lake to Burlington Industries raw water intake 2000' downstream of Rt. 360 Bridge	4-ABAN005.58	<i>E. coli</i>
L71R-04-BAC	VAC-L71R_BAN05A00	Banister River	8.13	2000' downstream of Rte 360 bridge (Burlington Industries' raw water intake) to its confluence with Wolf Trap Creek.	4-ABAN005.58	<i>E. coli</i>

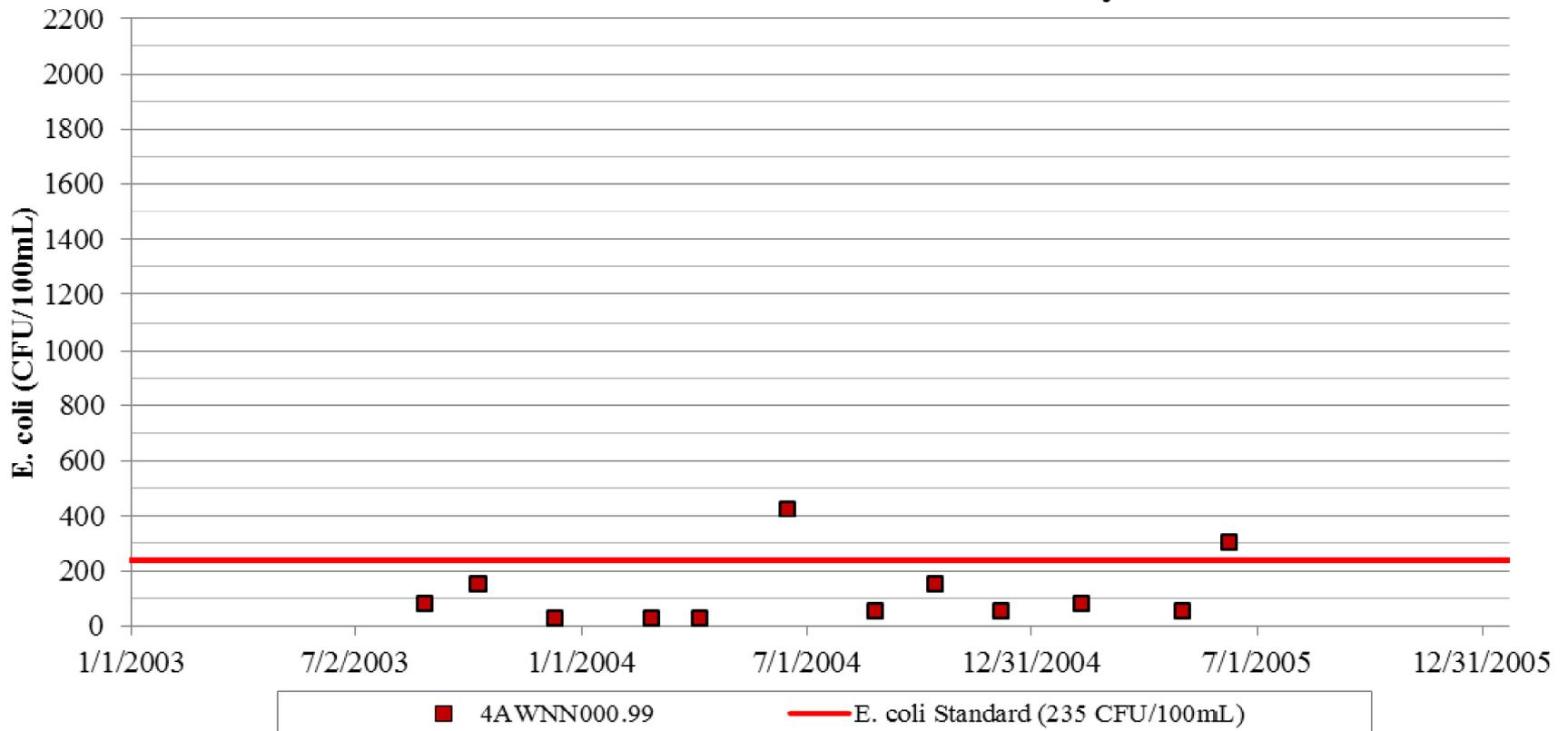
Banister River Bacteria

Banister River Mainstem - Bacteria Data Summary



Winn Creek Bacteria

Winn Creek - Bacteria Data Summary



Watershed Overview

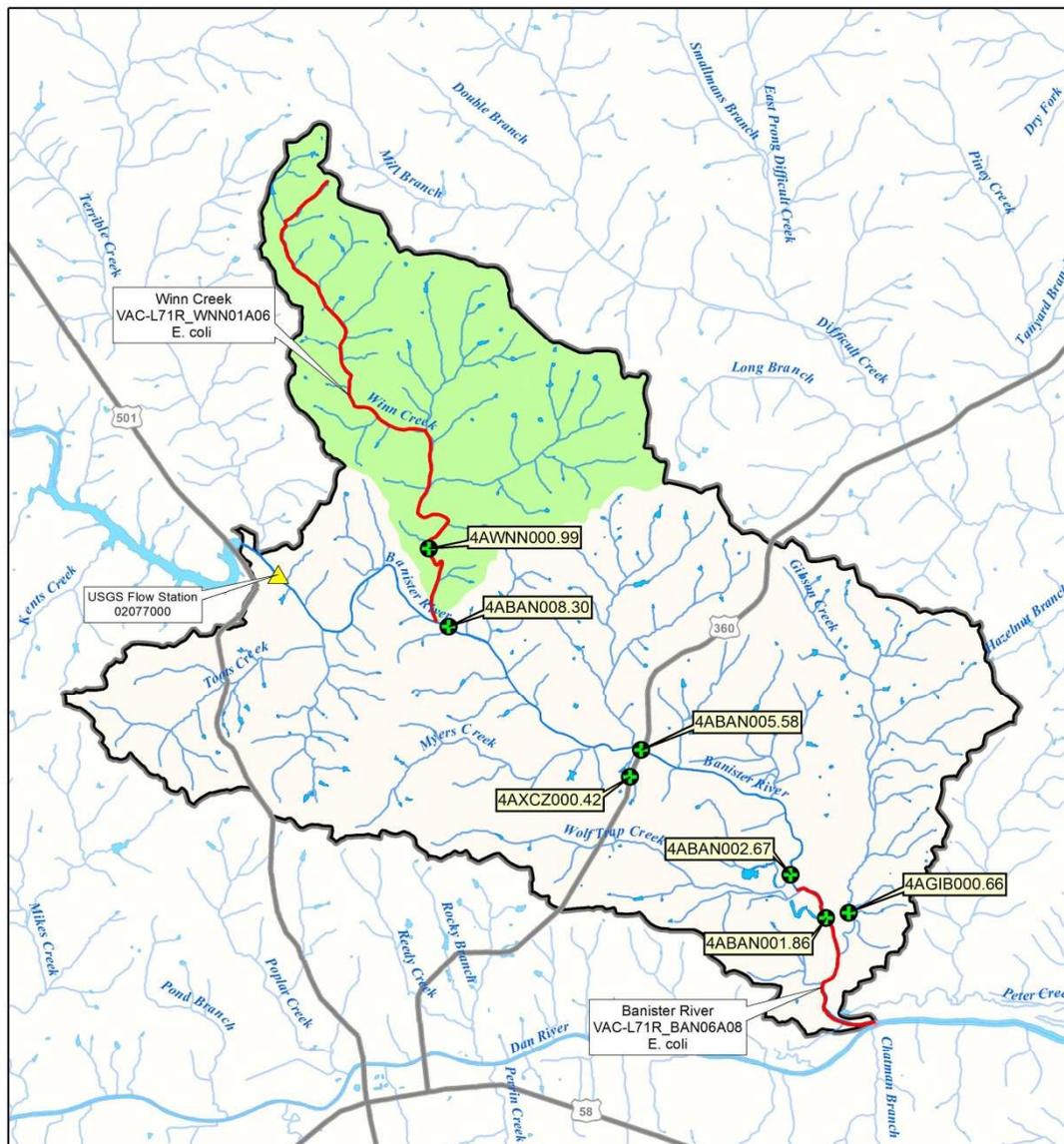
Banister River TMDL
Watershed Total Area: 32,060 acres

Winn Creek Watershed Total Area: 7,884 acres

Located within the Borders of Halifax County

Major Roads:

- **Highway 360 (James D Hagood Hwy)**
- **Highway 501 (Halifax Rd)**



- Legend**
- ▲ USGS Flow Station
 - VADEQ Monitoring Stations
 - US Highway
 - Impaired Rivers
 - Waterbody
 - Stream
 - ▭ TMDL Watershed
 - ▭ Winn Creek Watershed

Banister River and Winn Creek TMDLs Overview



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0 0.5 1 2 Miles

Sources: USGS, VADEQ, ESRI
Projection: NAD 1983 UTM Zone 17N

VA INDEX MAP



Landuse (NLCD 2006)

Banister River TMDL Watershed

Total Acres: 32,060

58.2%	Forest	(18,647 acres)
17.8%	Hay-Pasture	(5,578 acres)
7.5%	Urban	(2,396 acres)
6.8%	Herbaceous	(2,193 acres)
6.6%	Wetland	(2,112 acres)
3.1%	Other*	(1,133 acres)

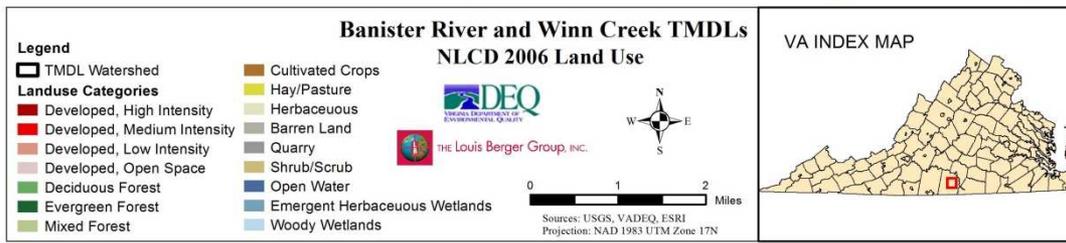
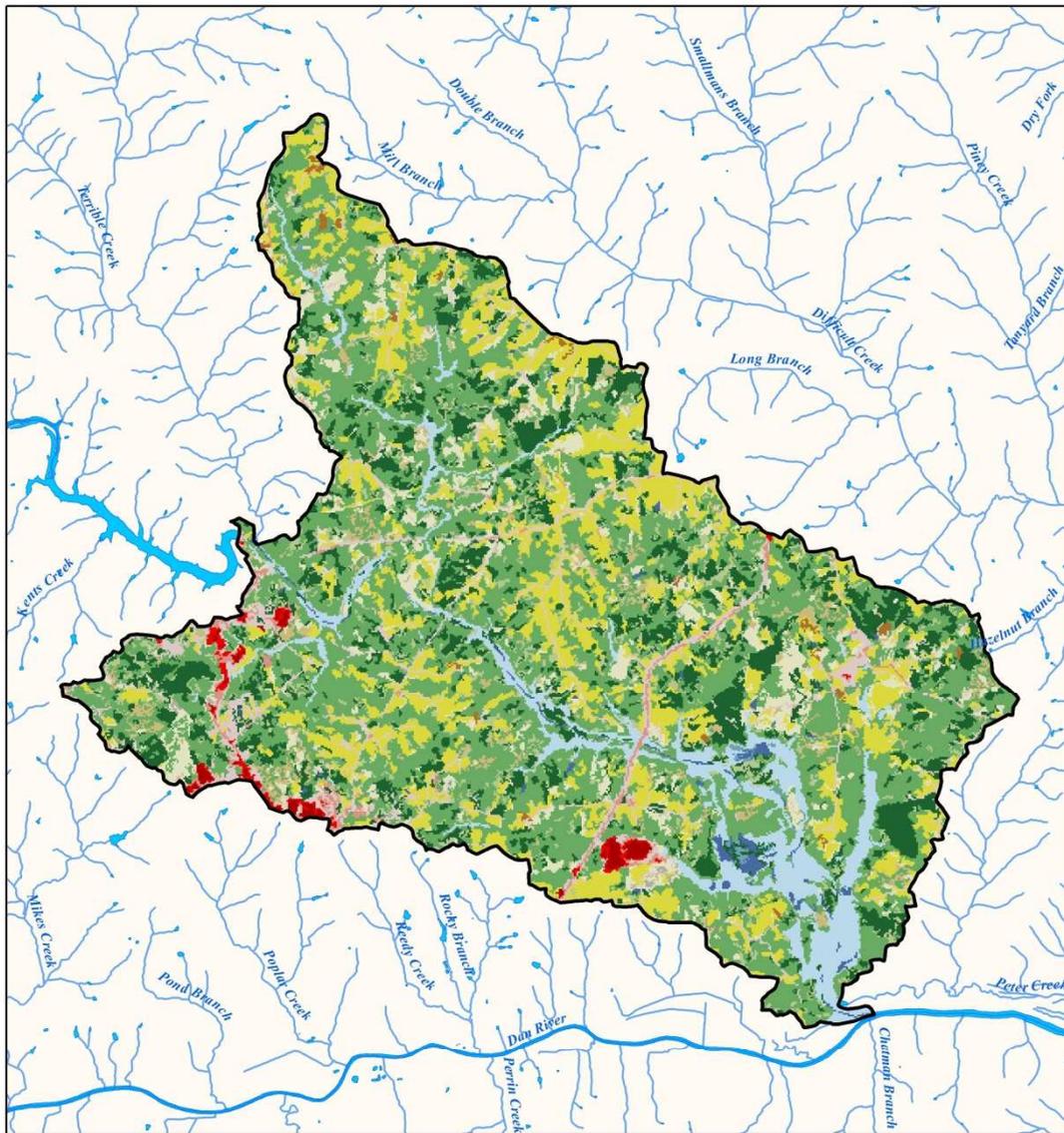
*other includes: Scrub/Shrub (2.3%), Open Water (0.7%), Cultivated Crops (0.4%), and Barren Land (0.1%)

Winn Creek Watershed

Total Area: 7,883 acres

59.0%	Forest	(4,650 acres)
21.4%	Hay-Pasture	(1,685 acres)
9.6%	Herbaceous	(753 acres)
4.6%	Urban	(364 acres)
2.9%	Wetland	(230 acres)
2.5%	Other*	(201 acres)

*other includes: Scrub/Shrub (1.6%), Cultivated Crops (0.7%), Open Water (0.1%), and Barren Land (0.1%)



Sources Inventory and Assessment

- **Human Sources** - Waste Disposal Methods (Septic Systems, Straight Pipes, Sewer)
- **Livestock Sources** - Livestock inventory, Livestock grazing and stream access, Confined animal facilities, Manure management
- **Wildlife Sources** - Wildlife Inventories
- **Pets Sources** - Pet Inventories

Modeling Approach

Hydrologic Simulation Program Fortran

Input



Model



Output

Factors:

Bacteria and Nutrient loads
Rainfall events
Bacteria build up
Bacteria wash off
Bacteria die off rates

Watershed Boundary

Land use

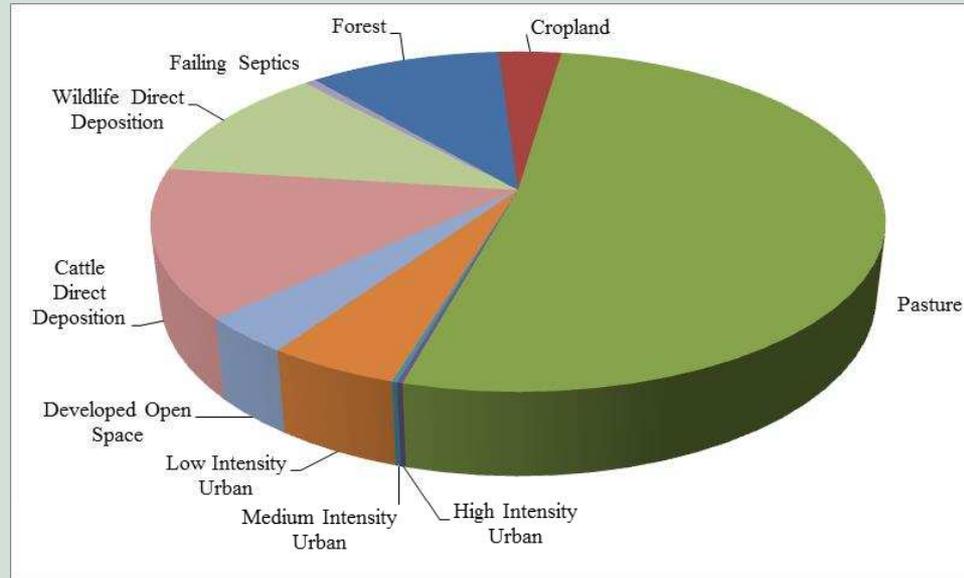
Soil

Stream

Pollutant Sources

River
Response

Winn Creek *E. coli* - Existing Annual Loading



Source	Annual Average <i>E. coli</i> Loads	
	cfu/yr	%
Forest	1.58E+12	10.1%
Cropland	5.08E+11	3.3%
Pasture	8.11E+12	52.0%
High Intensity Urban	3.04E+10	0.2%
Medium Intensity Urban	3.18E+10	0.2%
Low Intensity Urban	7.69E+11	4.9%
Developed Open Space	5.49E+11	3.5%
Cattle Direct Deposition	2.20E+12	14.1%
Wildlife Direct Deposition	1.74E+12	11.2%
Failing Septics	9.04E+10	0.6%
Total	1.56E+13	100%

Winn Creek TMDL Allocation

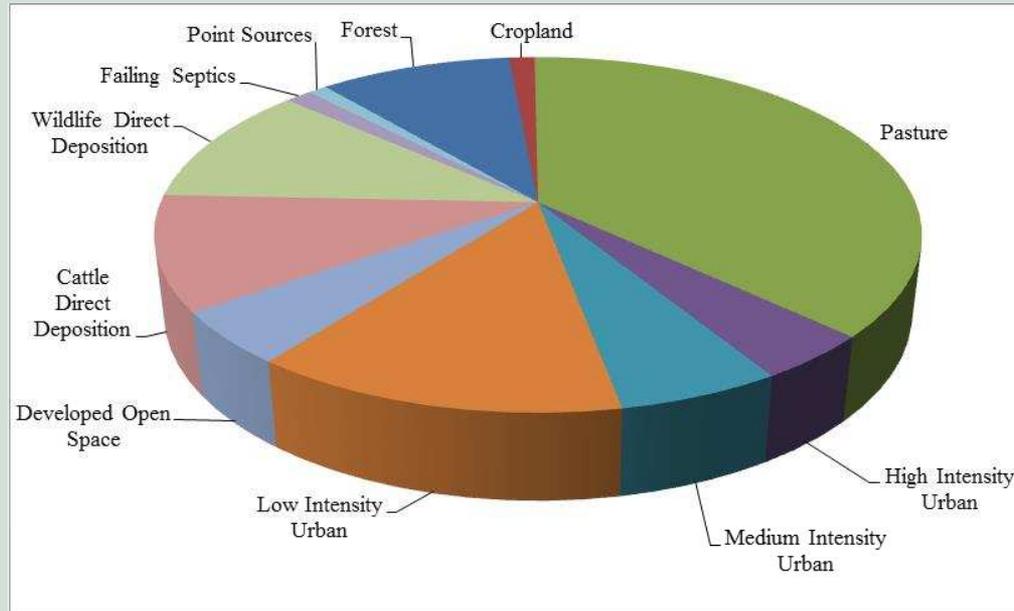
Source	Annual Average E. coli Loads (cfu/yr)		Percent Reduction
	Existing	Allocation	%
Forest	1.58E+12	1.58E+12	0.0%
Cropland	5.08E+11	1.52E+11	70.0%
Pasture	8.11E+12	2.43E+12	70.0%
High Intensity Urban	3.04E+10	9.12E+09	70.0%
Medium Intensity Urban	3.18E+10	9.54E+09	70.0%
Low Intensity Urban	7.69E+11	2.31E+11	70.0%
Developed Open Space	5.49E+11	1.65E+11	70.0%
Cattle Direct Deposition	2.20E+12	0.00E+00	100.0%
Wildlife Direct Deposition	1.74E+12	6.26E+11	64.0%
Failing Septics	9.04E+10	0.00E+00	100.0%
Point Sources¹	0.00E+00	5.21E+10	
Total	1.56E+13	5.21E+12	66.6%

Winn Creek TMDL for <i>E. coli</i> (cfu/year)				
Watershed	WLA ¹	LA	MOS	TMDL
Winn Creek	1.21E+10	5.21E+12	IMPLICIT	5.25E+12

Winn Creek TMDL for <i>E. coli</i> (cfu/day)				
Watershed	WLA ¹	LA	MOS	TMDL
Winn Creek	1.43E+08	4.45E+10	IMPLICIT	4.46E+10

¹Wasteload allocation for permitted point sources includes an allowance for the future growth and expansion of point sources in the watershed.

Banister River *E. coli* - Existing Annual Loading



Source	Annual Average <i>E. coli</i> Loads	
	cfu/yr	%
Forest	6.03E+12	9.7%
Cropland	7.93E+11	1.3%
Pasture	2.32E+13	37.2%
High Intensity Urban	2.63E+12	4.2%
Medium Intensity Urban	3.63E+12	5.8%
Low Intensity Urban	8.33E+12	13.4%
Developed Open Space	3.01E+12	4.8%
Cattle Direct Deposition	6.49E+12	10.4%
Wildlife Direct Deposition	6.82E+12	10.9%
Failing Septics	8.38E+11	1.3%
Point Sources	5.87E+11	0.9%
Total	6.24E+13	100.0%

Banister River TMDL Allocation

Source	Annual Average E. coli Loads (cfu/yr)		Percent Reduction
	Existing	Allocation	%
Forest	6.03E+12	6.03E+12	0.0%
Cropland	7.93E+11	1.98E+11	75.0%
Pasture	2.32E+13	5.80E+12	75.0%
High Intensity Urban	2.63E+12	6.58E+11	75.0%
Medium Intensity Urban	3.63E+12	9.08E+11	75.0%
Low Intensity Urban	8.33E+12	2.08E+12	75.0%
Developed Open Space	3.01E+12	7.53E+11	75.0%
Cattle Direct Deposition	6.49E+12	0.00E+00	100.0%
Wildlife Direct Deposition	6.82E+12	5.12E+12	25.0%
Failing Septics	8.38E+11	0.00E+00	100.0%
Point Sources ¹	5.87E+11	1.17E+12	-
Total	6.24E+13	2.27E+13	63.6%

Banister River TMDL for E. coli (cfu/year)				
Watershed	WLA ¹	LA	MOS	TMDL
Banister River	1.17E+12	2.15E+13	IMPLICIT	2.27E+13

Banister River TMDL for E. coli (cfu/day)				
Watershed	WLA ¹	LA	MOS	TMDL
Banister River	2.21E+09	1.29E+11	IMPLICIT	1.32E+11

¹Allocation for Permitted Point Sources (WLA) includes an allowance for the future growth and expansion of point sources in the watershed.

Implementation Plan Public Participation

Public Participation

- Public Meetings
 - Informational
 - Solicit public participation
 - Provide a forum for public comment
- Working Groups
 - Address “community” issues/concerns
- Steering Committee
 - Direct the overall process
 - Review output from working groups
 - Review future implementation



Working Groups

- Include:
 - Agricultural
 - Residential
 - Governmental
- Meet:
 - 1-2 times each
 - Starting April 2014



Agricultural Working Group

- Responsibilities:

- Identify potential constraints to implementation
- Identify alternative funding sources/partnerships
- Review implementation strategies from an agricultural perspective
- Identify outreach methods for engaging agricultural producers



Residential Working Group

■ Responsibilities:

- Identify possible constraints to implementation
- Evaluate corrective actions and costs
- Identify methods of outreach to homeowners with sewage problems
- Identify alternative funding sources/partnerships
- Review implementation strategies from a homeowner's perspective



Government Working Group

- Responsibilities:
 - Identify funding sources
 - Identify available technical resources
 - Identify appropriate “measurable goals” and timeline for achievement
 - Identify regulatory controls currently in place
 - Identify potential parties to be responsible for agricultural and residential implementation

Steering Committee

- **Includes:**
 - Representatives from each working group
 - Local, state and federal agency representatives involved in plan
 - Watershed citizens
- **Meet:** Generally one time during plan development
- **Responsibilities:**
 - Review contractor's results
 - Assess input from working groups
 - Address community concerns/suggestions
 - Help guide the process:
 - Are we getting “representative” input?
 - How can we do better?

TMDL Implementation Plan Schedule

- **March 2014: Initiate IP development**
- **Apr. 2014: 1st public meeting and 1st working group meetings**
- **May 2014: Government working group meeting**
- **July 2014: 2nd Working group meetings**
- **Oct. 2014: Steering Committee meeting**
- **Nov. 2014: 2nd (final) public meeting**
- **Dec. 2014: Finalize IP**

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**Questions?
Comments?**



**Banister River and Winn Creek
Agricultural and Residential
Working Groups**

Residential BMPs

Sewage Disposal

- Septic System Pump out (RB-1)
- Sewer Connection (RB-2)
- Repaired Septic System (RB-3)
- Septic System Installation/Replacement (RB-4)
- Alternative Waste Treatment System Installation (RB-5)



Residential BMPs

Pet Waste

- Pet Waste Stations
- Pet Waste Digester/Composter
- Educational Campaign



SCOOP the **POOP**



-  **Always use a bag or scooper to clean up your pet's waste.**
-  **Poop left on the ground washes into local streams, lakes & rivers.**
-  **Dog droppings are a leading cause of E.coli pollution in local waters.**

Do your part: Scoop the Poop to keep our water clean!

Greenville County Soil & Water Conservation District



Sewage Disposal Method Estimates

TMDL Watershed	Number of Houses ¹	Number of Houses Public Sewer ²	Number of Houses on Septic Systems ²	Number of Houses on "Other Means" ²	Number of Houses with a Failing Septic System ³
Banister River	1,957	270	1,501	187	60
Winn Creek	371	51	284	35	11
¹ Manual count using Imagery					
² Based upon 1990 census breakdown of sewage disposal					
³ Based on a septic failure rate of 4% (VDH, 2013)					

Sewage Disposal Methods within 200 feet of Streams	
Houses within 200ft of Streams	Estimated Houses with Direct Pipe to Stream*
44	4

*Based on the "Other Means" Sewage Disposal (9.5% of systems)

Residential BMP Efficiencies

Residential BMPs	Bacteria Removal Efficiency
Pet Waste	
Educational Campaign	50%
Pet Waste Stations	100%
Residential Waste	
Total Septic Pumpout (RB-1)	5%
Sewer Connection (RB-2)	100%
Total Septic Repair (RB-3)	100%
Total Septic Install/Replace (RB-4)	100%
Total Alternative Waste Treatment System (RB-5)	100%

Livestock Management BMPs

Livestock Exclusion and Manure Management

- CREP Livestock Exclusion (CRSL-6)
- Livestock Exclusion with Grazing Land Management (SL-6T/LE-1T)
- Small Acreage Grazing Systems (SL-6A)
- Livestock Exclusion with Reduced Setback (LE-2T)
- Stream Protection/Fencing (WP-2T)
- Manure Storage (WP-4)



Pastureland BMPs

Pasture

- Vegetative Cover on Critical Areas (SL-11)
- Reforestation of Erodible Pasture (FR-1)
- Pasture Management (EQIP 528, SL-10T)



Cropland BMPs

Cropland

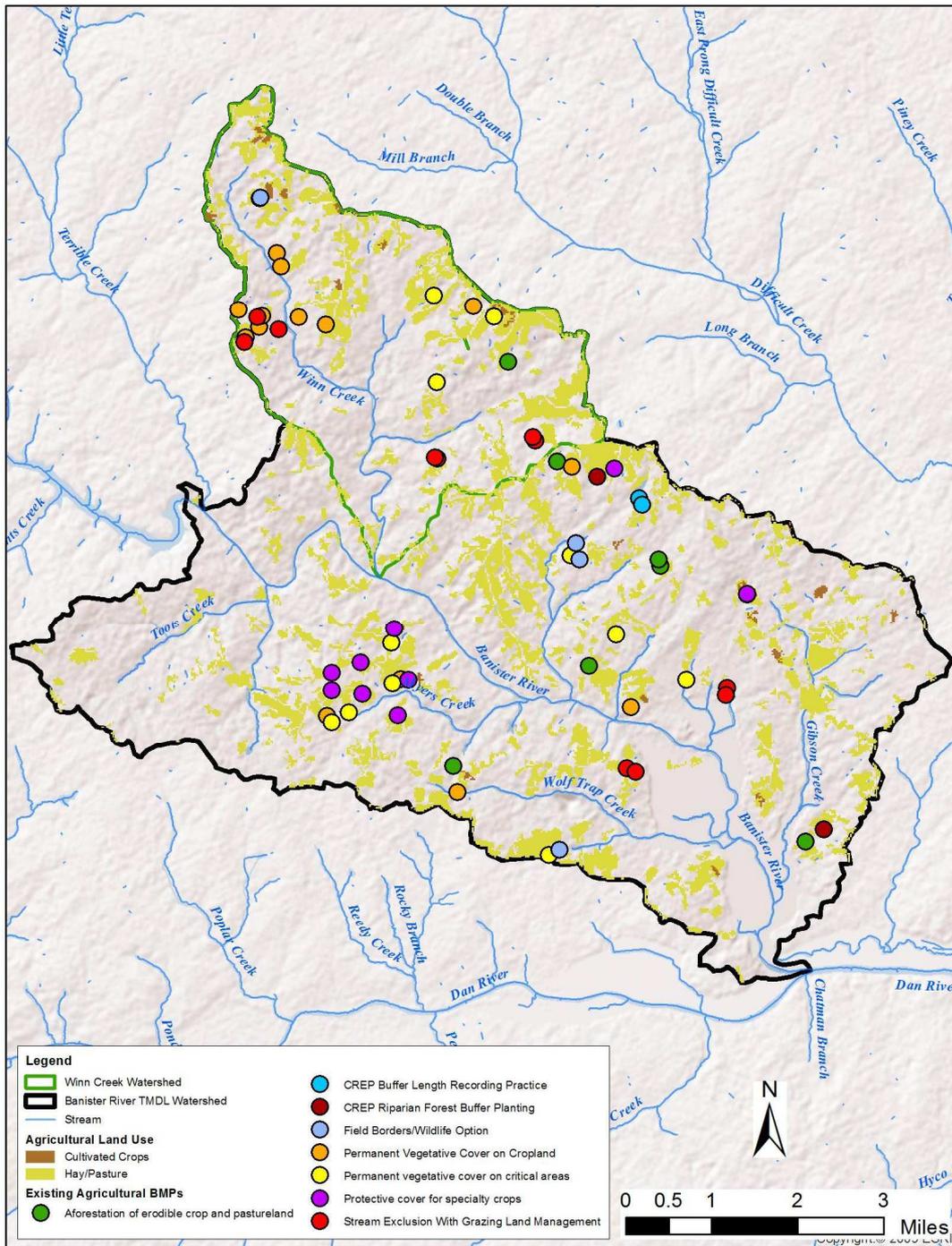
- Continuous No-Till (SL-15)
- Small Grain Cover Crop (SL-8)
- Permanent Vegetative Cover on Cropland (SL-1)
- Cropland Buffers (CP-33 and WQ-1)
- Field Borders/Wildlife Option (WL-1)



Agricultural BMP Efficiencies

Agricultural BMPs	Bacteria Removal Efficiency
Cropland	
Continuous No-Till (SL-15)	70%
Small Grain Cover Crop (SL-8)	20%
Permanent Vegetative Cover on Cropland (SL-1)	75%
Cropland Buffers (CP-33 and WQ-1)	50%
Field Borders/Wildlife Option (WL-1)	LU Conversion
Livestock Exclusion System and Manure Management	
CREP Livestock Exclusion (CRSL-6)	100%
Livestock Exclusion (SL-6T/LE-1T)	100%
Livestock Exclusion w/ Reduced Setback (LE-2T)	100%
Small Acreage Grazing System (SL-6AT)	100%
Stream Protection/Fencing (WP-2T)	100%
Manure Storage (WP-4) - Beef	80%
Pasture	
Vegetative Cover on Critical Areas (SL-11)	75%
Reforestation of Erodible Pasture (FR-1)	LU Conversion
Pasture Management (EQIP 528, SL-10T)	50%

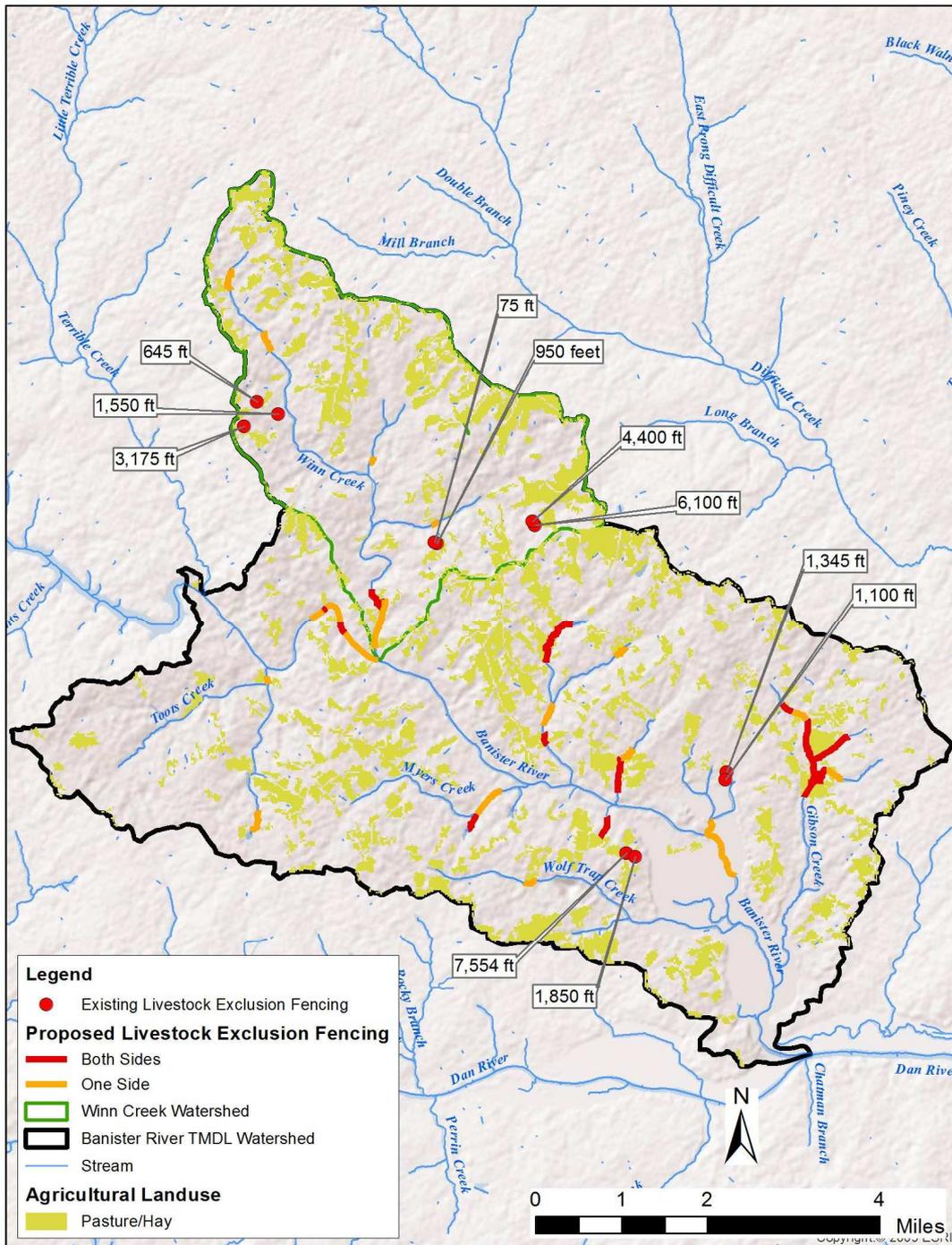
Existing Agricultural BMPs



Agricultural Practice	Units	Unit Type
Aforestation of erodible crop and pastureland	63.5	Acres
CREP Buffer Length Recording Practice	2,013	Lin-Ft
CREP Riparian Forest Buffer Planting	44.0	Acres
Field Borders/Wildlife Option	4.4	Acres
Permanent vegetative cover on critical areas	15.0	Acres
Permanent Vegetative Cover on Cropland	189.7	Acres
Protective cover for specialty crops	152.7	Acres
Stream Exclusion With Grazing Land Management	28,744	Lin-Ft

Existing Agricultural BMP information originated from the DCR Agricultural Cost Share Database

Proposed Livestock Exclusion BMPs



Watershed	Livestock Exclusion Length	
	Feet	Miles
Banister River	61,035	11.6
Winn Creek	10,184	1.9
Total	71,219	13.5