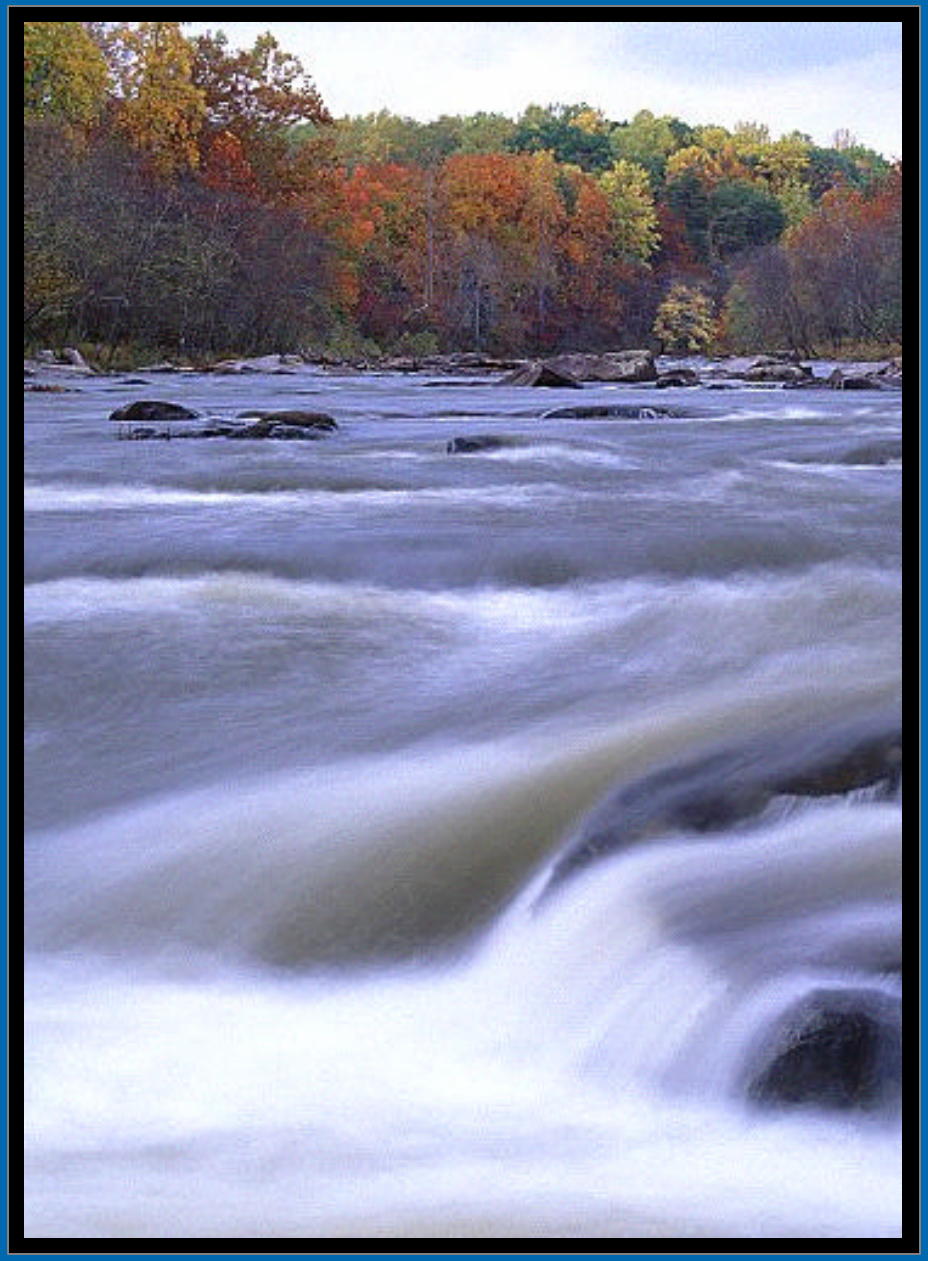


Upper Rappahannock River Basin

Total Maximum Daily Load Study

Public Meeting
Washington, Virginia
October 11, 2006

Meeting Agenda

- Introductions
- Water Quality Assessments and TMDL Process

  Katie Conaway, VA DEQ
- Overview of Rappahannock 16 TMDL

  Katie Conaway, VA DEQ
- Bacteria TMDL Source Assessment

  Byron Petrauskas, Engineering Concepts, Inc.
- Questions

Why are we here?

Purpose of the Project:

To develop Total Maximum Daily Loads (TMDLs) for 16 bacteria impaired stream segments in the Upper Rappahannock River Basin.

Getting Started

- Monitor and assess water quality of Virginia's navigable waters.
- Prepare the Water Quality Integrated Assessment Report 305(b) Report and 303(d) List.
- Perform a Total Maximum Daily Load Study on any stream segment listed as Impaired on the 303(d) List.

Water Quality Standards

- Waters are listed as impaired based on Water Quality Standards (WQS).

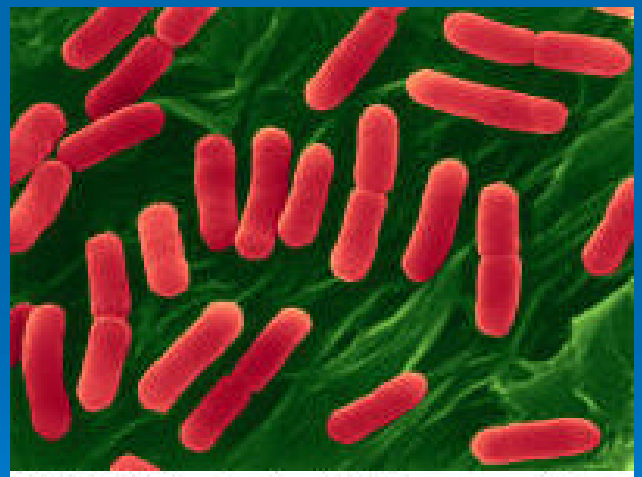
- Water Quality Standards:
  - Regulations based on federal and state law.
  - Set numeric and narrative limits on pollutants.
  - Consist of designated use(s) and water quality criteria to protect the designated uses.

Designated Uses

- **Recreational**
- **Aquatic Life**
- **Public Water Supply**
- **Wildlife**
- **Fish Consumption**
- **Shellfish**

Fecal Coliform Bacteria and E. coli Bacteria

- **For primary contact recreation use, waters are assessed using fecal coliform and *E. coli* bacteria measurements*.**



Fecal bacteria:

- **Found in the digestive tract of humans and warm blooded animals.**
- **Indicator of the potential presence of pathogens in waterbodies.**

E. coli:

- **subset of fecal coliform bacteria.**
- **correlate better with swimming-associated illness.**

**** In order for a waterbody to be listed as impaired:***

- There must be at least two samples that exceed the water quality criterion.

- Greater than 10.5% of the total samples must be exceedances.

Summary of Changes in Primary Contact Criteria

Indicator	Status	Instantaneous Maximum (cfu/100mL)	Geometric Mean (cfu/100 mL)
Fecal Coliform	Old	1,000	200
Fecal Coliform	Interim	400	200
E. coli	New	235	126

- **Changes went into effect on January 15, 2003**
- **Both New *E. coli* and Interim Fecal Coliform criteria apply**
- **Fecal coliform criteria will be phased out entirely once 12 *E. coli* samples have been collected or after June 30, 2008**

What is a TMDL ?
Total Maximum Daily Load

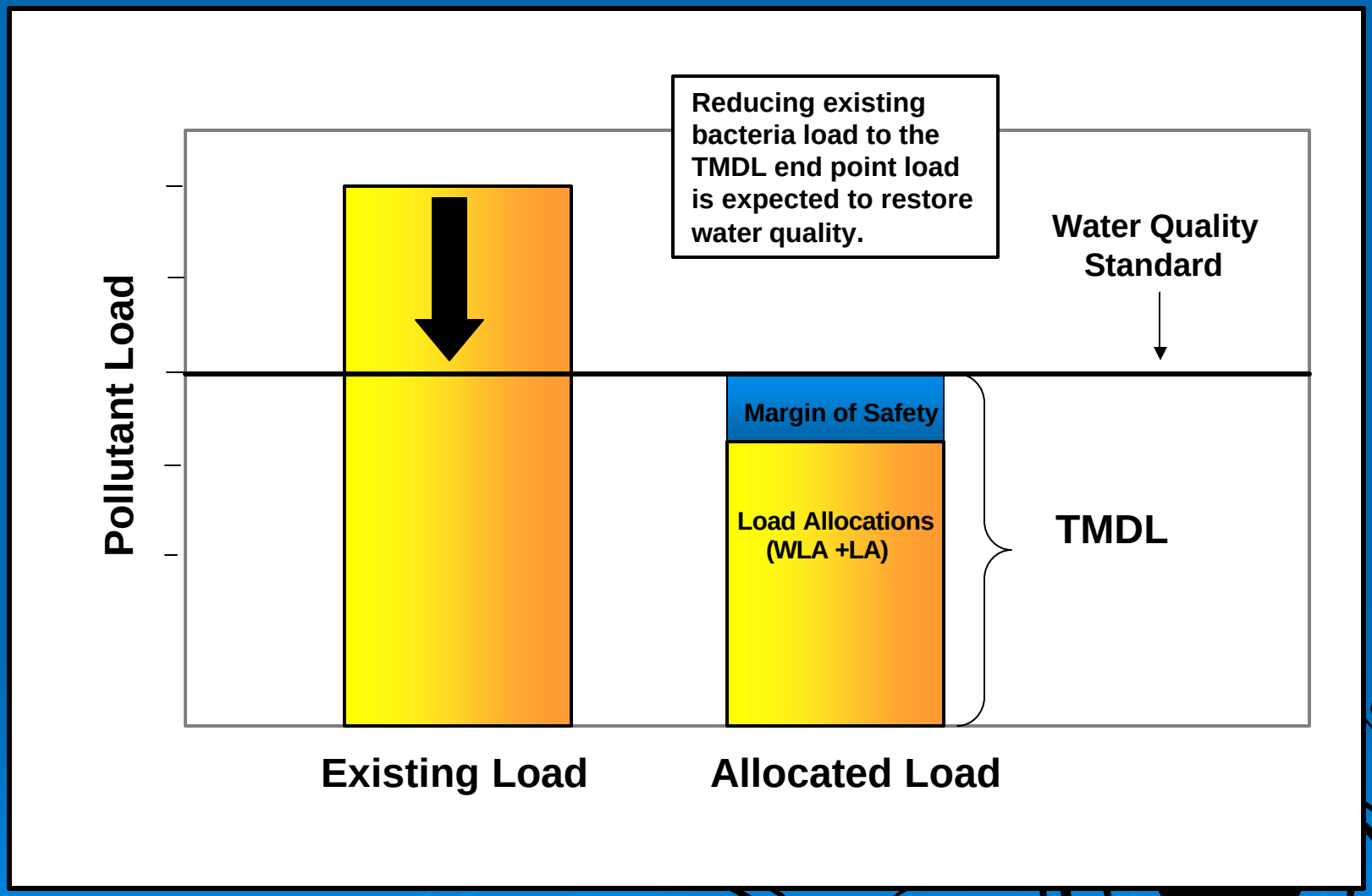
A TMDL is a **pollution budget**:

TMDL = Sum of WLA + Sum of LA + MOS

Where:

TMDL	**=**	**Total Maximum Daily Load**
WLA	**=**	**Waste Load Allocation (point sources)**
LA	**=**	**Load Allocation (nonpoint sources)**
MOS	**=**	**Margin of Safety**

An Example TMDL



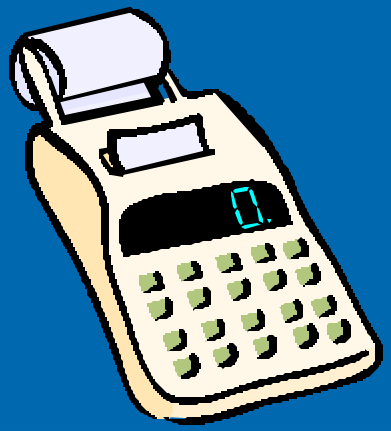
Required Elements of a TMDL

A TMDL must:

- Be developed to meet Water Quality Standards.
- Be developed for critical stream conditions.
- Consider seasonal variations.
- Consider impacts of background contributions.
- Include wasteload and load allocations (WLA, LA).
- Include a margin of safety (MOS).
- Be subject to public participation.
- Provide reasonable assurance of implementation.

TMDL Development Methodology

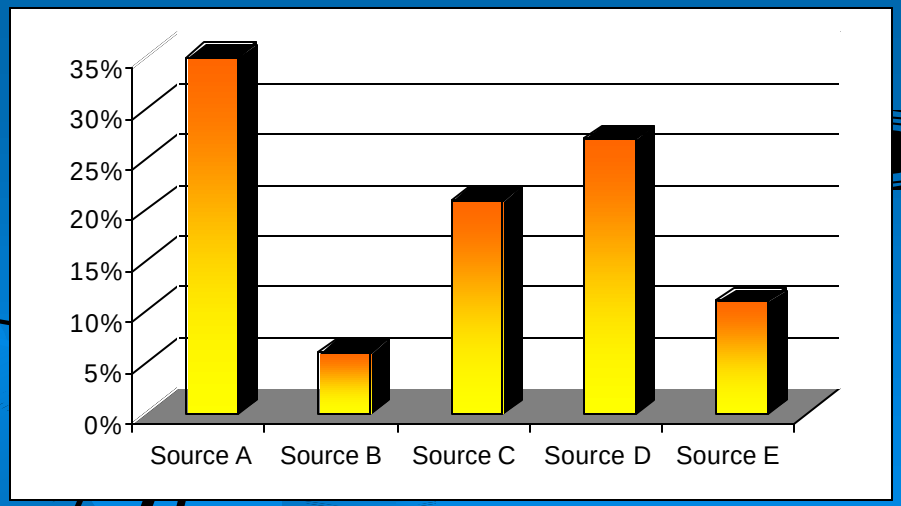
1. Identify all types of sources of a given pollutant within the watershed.



2. Calculate the amount of pollutant entering the stream from each source type.

3. Calculate the pollutant reductions needed, by source, to attain Water Quality Standards.

4. Allocate the allowable loading to each source and include a margin of safety.



Three Step TMDL Process in Virginia

1. **TMDL Development - find the source of the pollutant & determine the reduction needed.**

2. **Implementation Plan Development - identify conservation measures to fix the problem. Conservation measures are often called Best Management Practices or BMPs.**

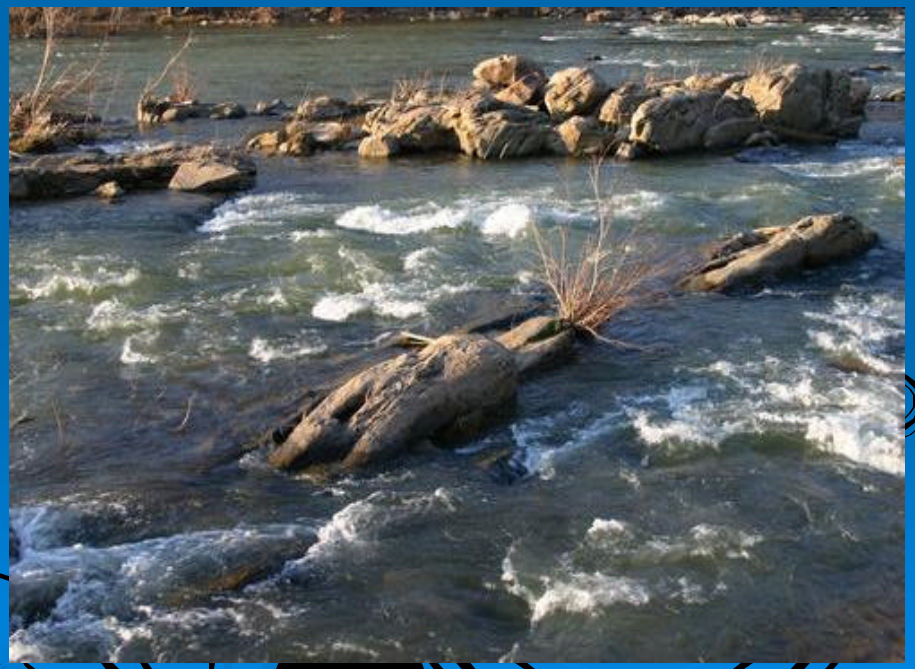
3. **Implement the BMPs and sample to see improvement.**

How a TMDL Project is Managed

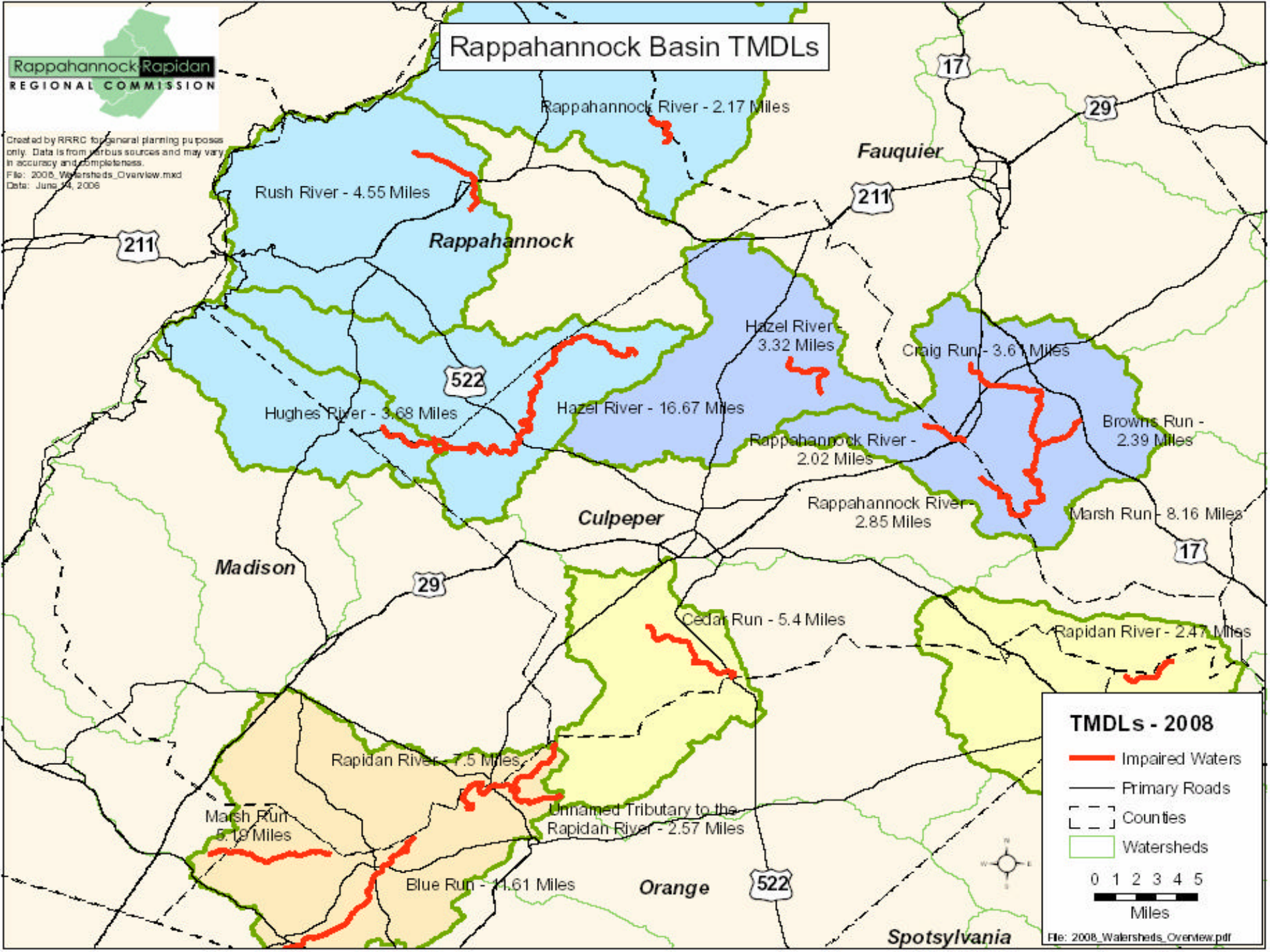
- DEQ is the Project Lead for the TMDL Development Phase (DCR provides assistance).
- DEQ subcontracts out the modeling and technical work involved in TMDL Development.
- Stakeholder and public participation:
  - Other VA Agencies, Local Governments, Community Groups, etc. are invited to participate in Technical Advisory Committee meetings.
  - The general public and interested stakeholders are invited to public information meetings.
- Once the study has been approved by the EPA and the State Water Control Board, the Implementation Plan process begins.
- DCR is the lead for Implementation Plan Development (DEQ provides assistance).

Upper Rappahannock TMDL Study

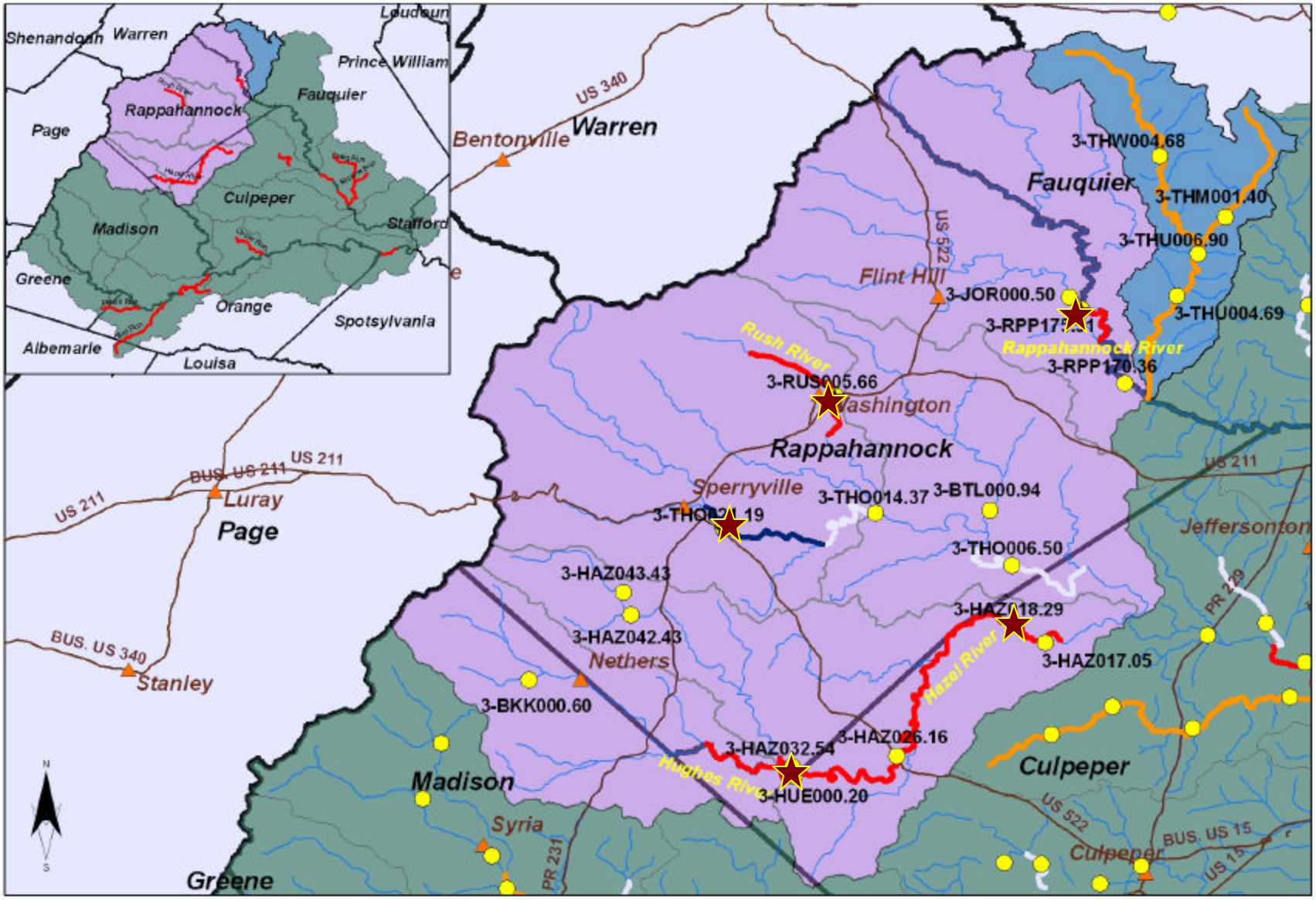
- 16 segments in Rappahannock River Basin.
- Covers portions of 8 Counties (Albemarle, Culpeper, Fauquier, Greene, Madison, Orange, Rappahannock, and Spotsylvania).
- Two TACs:
  - Upper Rappahannock Watershed
  - Rapidan Watershed



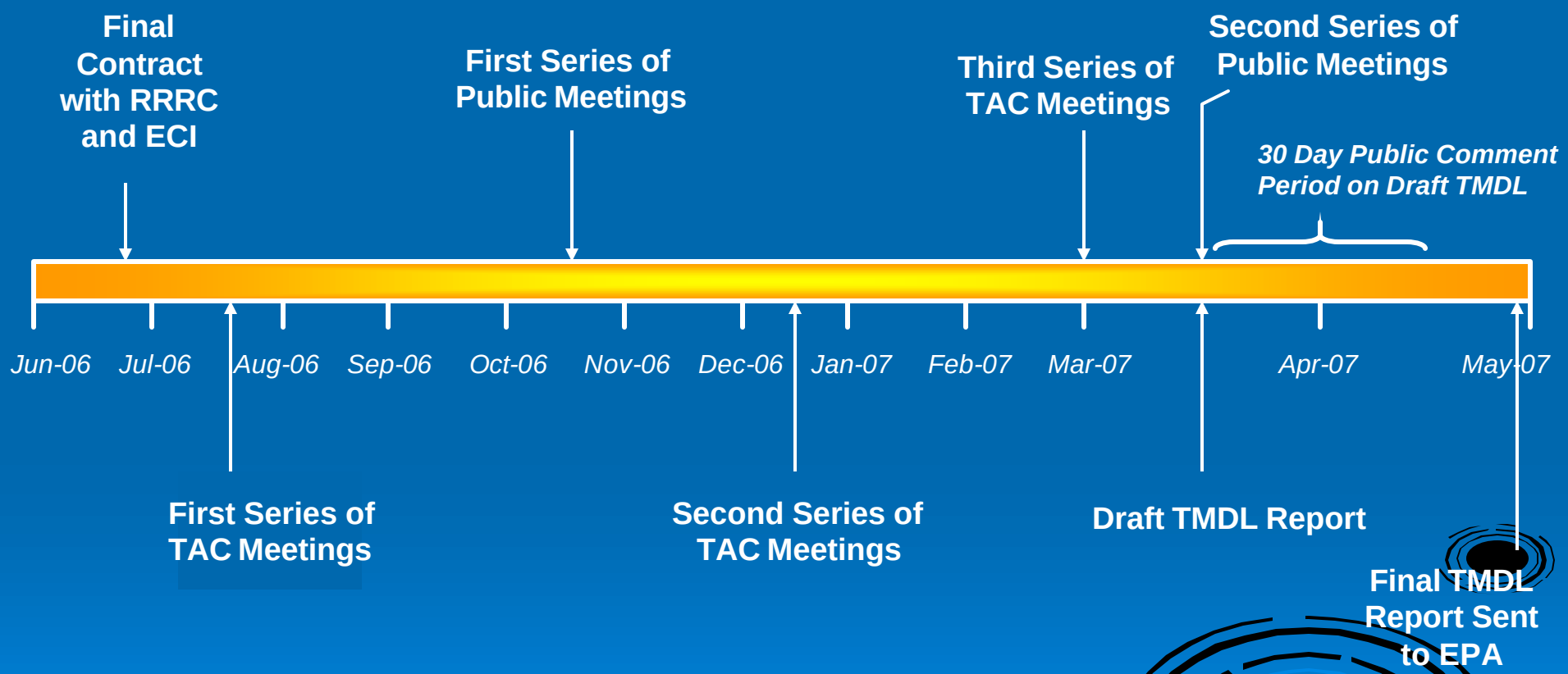
****A complete list of the impaired segments addressed by this TMDL can be found attached to the end of this presentation (Light Blue Handout).*


Rappahannock Basin TMDLs
Rappahannock Rapidan
REGIONAL COMMISSION
Created by RRRC for general planning purposes only. Data is from various sources and may vary in accuracy and completeness.
File: 2008_Watersheds_Overview.mxd
Date: June 14, 2008
Rappahannock River - 2.17 Miles
Rush River - 4.55 Miles
Rappahannock
Fauquier
Hazel River - 3.32 Miles
Craig Run - 3.61 Miles
Hughes River - 3.68 Miles
Hazel River - 16.67 Miles
Browns Run - 2.39 Miles
Rappahannock River - 2.02 Miles
Rappahannock River - 2.85 Miles
Marsh Run - 8.16 Miles
Culpeper
Madison
Cedar Run - 5.4 Miles
Rapidan River - 2.47 Miles
Rapidan River - 7.5 Miles
Marsh Run - 5.19 Miles
Unnamed Tributary to the Rapidan River - 2.57 Miles
Blue Run - 11.61 Miles
Orange
Spotsylvania
17
29
211
522
TMDLs - 2008
Impaired Waters
Primary Roads
Counties
Watersheds
0 1 2 3 4 5
Miles
File: 2008_Watersheds_Overview.pdf

DEQ Monitoring Stations in the Upper Rappahannock River Watershed



Upper Rappahannock River Basin TMDL
Project Milestones



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Additional Information

1. **List of all the Impaired Stream Segments addressed in this TMDL Study.**
2. **List of DEQ Monitoring Stations that were used to list the segments in the Upper Rappahannock TMDL Study as impaired.**
3. **List of impaired stream segments in the Upper Rappahannock River watershed that are NOT addressed in this TMDL.**

Rappahannock Watershed Technical Advisory Committee					
Stream Name	Locality	Impairment	Length (miles)	Upstream Limit	Downstream Limit
Hughes River	Culpeper Rappahannock	Bacteria	3.68	Kilbys Run	Hazel River
Hazel River	Culpeper	Bacteria	16.67	Rt. 707 Bridge	Unnamed Tributary
Hazel River	Culpeper	Bacteria	3.32	Indian Run	Muddy Run
Rush River	Rappahannock	Bacteria	4.55	Unnamed Tributary	Big Branch
Rappahannock River	Fauquier Rappahannock	Bacteria	2.17	Jordan River	UT
Marsh Run	Fauquier	Bacteria	8.35	Craig Run	Rappahannock River
Browns Run	Fauquier	Bacteria	2.39	Unnamed Tributary	Marsh Run
Craig Run	Fauquier	Bacteria	3.61	Headwaters of Craig Run	Marsh Run
Rappahannock River	Culpeper Fauquier	Bacteria	2.02	Ruffans Run	Tinpot Run
Rappahannock River	Culpeper Fauquier	Bacteria	2.85	Unnamed Tributary	Marsh Run

Rapidan Watershed Technical Advisory Committee					
Stream Name	Locality	Impairment	Length (miles)	Upstream Limit	Downstream Limit
Blue Run	Orange Albemarle	Bacteria	11.61	Headwaters of Blue Run	Rapidan River
Rapidan River	Culpeper Madison Orange	Bacteria	7.5	Poplar Run	Robinson River
Marsh Run	Greene Madison Orange	Bacteria	5.19	Headwaters of Marsh Run	Rapidan River
Unnamed Tributary to Rapidan River	Madison Orange	Bacteria	2.57	Headwaters of Unnamed Tributary	Rapidan River
Cedar Run	Culpeper	Bacteria	5.4	Buck Run	Rapidan River
Rapidan River	Culpeper Spotsylvania	Bacteria	2.68	Wilderness Run	Middle Run

DEQ Listing Stations for Upper Rappahannock

TMDL ID	Stream Name	Monitoring Station	Station Location	Year First Listed as Impaired	2004 Exceedance Rate *Fecal Coliform Standard*	2006 Exceedance Rate	
						Fecal Coliform Standard	*E. Coli Standard*
VAN-E08R-02	Browns Run	3-BOS000.72	Route 653	2002	57% (4 of 7)	100% (3 of 3)	N/A
VAN-E08R-03	Craig Run	3-CRA000.82	Route 656	2004	43% (3 of 7)	100% (3 of 3)	N/A
VAN-E04R-01	Hazel River	3-HAZ018.29	Route 729	2002	20% (4 of 20)	15% (3 of 20)	33% (3 of 9)
		3-HAZ026.16	Route 522	2006	N/A	33% (2 of 6)	33% (2 of 6)
		3-HAZ032.54	Route 644	2006	N/A	21% (3 of 14)	N/A
60076	Hazel River	3-HAZ005.98	Route 625	2006	N/A	36% (5 of 14)	50% (5 of 10)
VAN-E03R-01	Hughes River	3-HUE000.20	Route 644	2004	12% (2 of 17)	16% (3 of 19)	36% (4 of 11)
VAN-E08R-01	Marsh Run	3-MAH000.19	Route 651	1996	21% (3 of 14)	N/A	29% (2 of 7)
		3-MAH004.18	Route 668	1996	44% (4 of 9)	75% (3 of 4)	N/A
VAN-E08R-04	Rappahannock River	3-RPP147.10	Route 15/29	2004	22% (8 of 37)	N/A	39% (5 of 13)
VAN-E01R-03	Rappahannock River	3-RPP175.51	Route 647	2002	16% (3 of 19)	N/A	29% (4 of 14)
60081	Rappahannock River	3-RPP142.36	Route 620	2006	N/A	N/A	29% (2 of 7)
VAN-E05R-01	Rush River	3-RUS005.66	Route 683, upstream of Route 211/522	2002	24% (4 of 17)	22% (4 of 18)	44% (4 of 9)

DEQ Listing Stations for the Rapidan River

TMDL ID	Stream Name	Monitoring Station	Station Location	Year First Listed as Impaired	2004 Exceedance Rate *Fecal Coliform Standard*	2006 Exceedance Rate	
						Fecal Coliform Standard	*E. Coli Standard*
VAN-E13R-01	Blue Run	3-BLU002.60	Route 20	2002	40% (8 of 20)	35% (7 of 20)	50% (3 of 6)
		3-BLU006.44	Bridge for an unnamed road through Tibbstown	2006	N/A	40% (2 of 5)	N/A
VAN-E16R-01	Cedar Run	3-CED000.59	Route 522	2004	25% (5 of 20)	15% (2 of 13)	N/A
		3-CED003.52	Route 652	N/A	N/A	38% (3 of 8)	100% (3 of 3)
VAN-E13R-03	Marsh Run	3-MAS001.55	Route 644	2004	67% (2 of 3)	31% (4 of 13)	N/A
VAN-E13R-02	Rapidan River	3-RAP045.08	Route 15	2002	29% (10 of 35)	N/A	43% (6 of 14)
VAN-E18R-01	Rapidan River	3-RAP006.53	Route 610	2002	32% (12 of 38)	N/A	58% (7 of 12)
VAN-E13R-04	Unnamed Tributary to Rapidan River	3-XEZ000.12	Route 634	2004	100% (2 of 2)	43% (3 of 7)	40% (2 of 5)

*** In order for a waterbody to be listed as impaired:**

1. **There must be at least two exceedances of the water quality criterion**
2. **Greater than 10.5% of the total samples must be exceedances.**