

# Roanoke River Watershed

## Clean up Plan



THE Louis Berger Group, INC.



# Agenda

- Why are we here?
- DEQ's Water Monitoring Program
- What is a TMDL?
- Roanoke River watershed TMDLs
- Roanoke River watershed Clean up Plan
- How YOU can get involved!
- Next Steps



# Why are We Here?

- Clean up the Upper Roanoke River watershed!
- Healthy watersheds are important!
  - Protect human health
  - Prevent flood damage & clean-up costs
  - Increase property values
  - Encourage revenue-generating recreational opportunities
  - Lower drinking water treatment costs
  - Reduces drought effects



# Why Are We Here?

Constitution of Virginia, Article 11:

“... it shall be the Commonwealth's policy to protect its atmosphere, lands, **and waters from pollution, impairment**, or destruction, for the **benefit, enjoyment, and general welfare** of the people of the Commonwealth.”



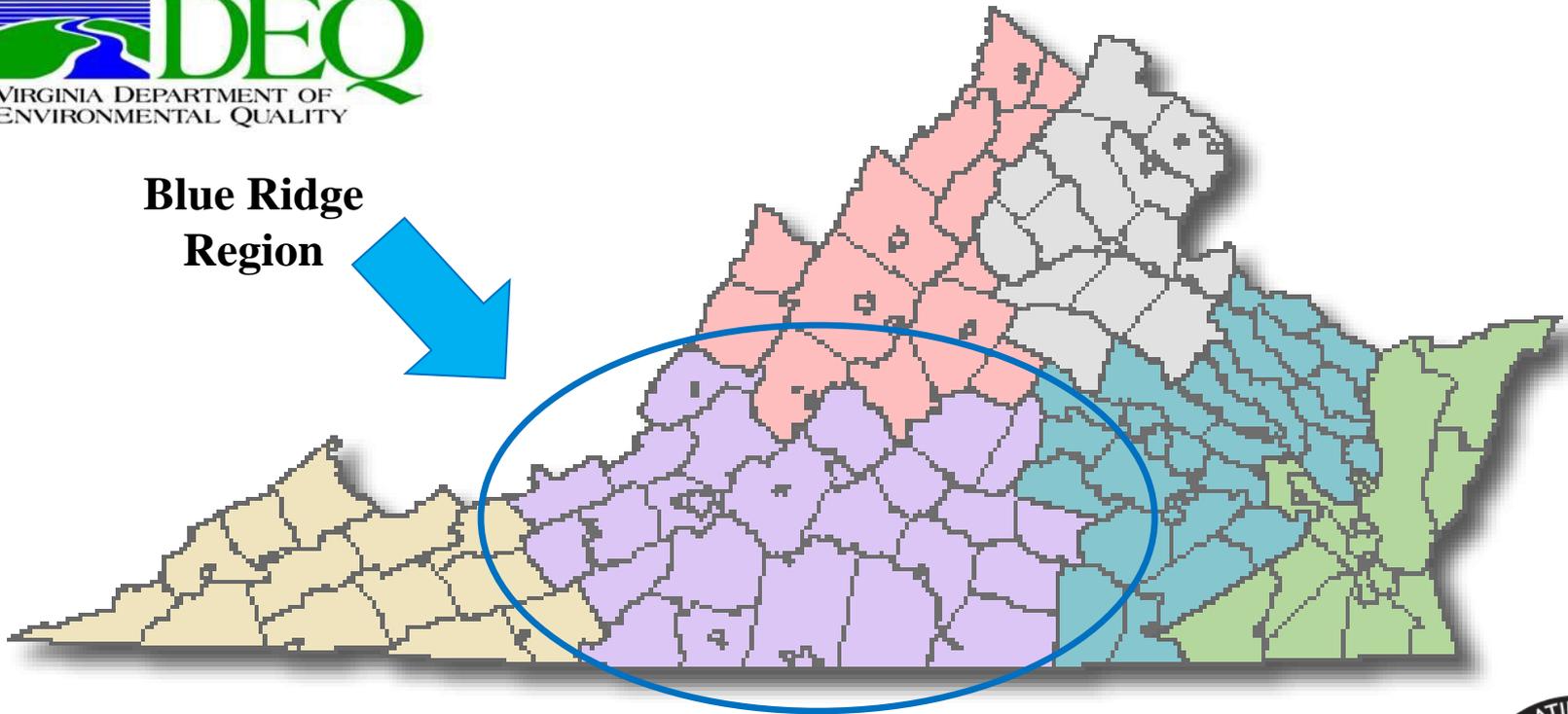
# Why are We Here?



# DEQ Regions



**Blue Ridge  
Region**



# DEQ Water Programs: Why does DEQ monitor water quality?

- 1972 Clean Water Act
- 1997 Water Quality Monitoring, Information, and Restoration Act
- VA Pollution Discharge Elimination System permitting (Section 402, Clean Water Act)
- TMDLs, Citizen requests, reporting on overall statewide water quality



# DEQ Water Programs: Why does DEQ monitor water quality?



- Water Chemistry
  - *Ambient Water Quality Monitoring Program*
  - Chesapeake Bay Program
  - Probabilistic Monitoring Program
- Aquatic Organisms
  - *Biological Monitoring Program*
  - Probabilistic Monitoring Program
- Toxics
  - Special Studies
  - Pollution Response Program
  - Probabilistic Monitoring Program



# DEQ Water Programs: How does DEQ monitor water quality?

*VISIT THE DEQ EXHIBIT!*

- Chemical monitoring
  - Bacteria (E.Coli), nutrients, solids
  - Captures ambient conditions



<http://www.labnews.co.uk/>

<http://wdict.net/word/escherichia+coli/>



BRYAN BRANDENBURG

# DEQ Water Programs: How does DEQ monitor water quality?

*VISIT THE DEQ EXHIBIT!*

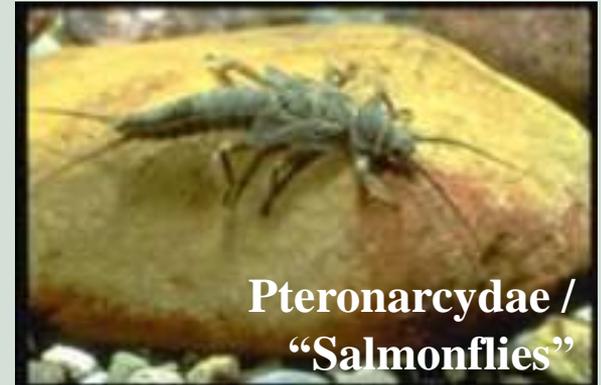
- Biological Monitoring = Biomonitoring!
  - Collect a sample of the aquatic invertebrate community, spring & fall
  - Habitat Analysis – habitat dictates the community
- Why Biomonitoring
  - Aquatic invertebrates are indicators of stream health
  - Fish food



# What makes a “healthy” aquatic invertebrate community?

- Diversity
- Presence of invertebrates that are intolerant of pollution
  - Stonefly, Mayfly & Caddisfly larvae
- Desirable Habitat

*VISIT THE DEQ EXHIBIT!*

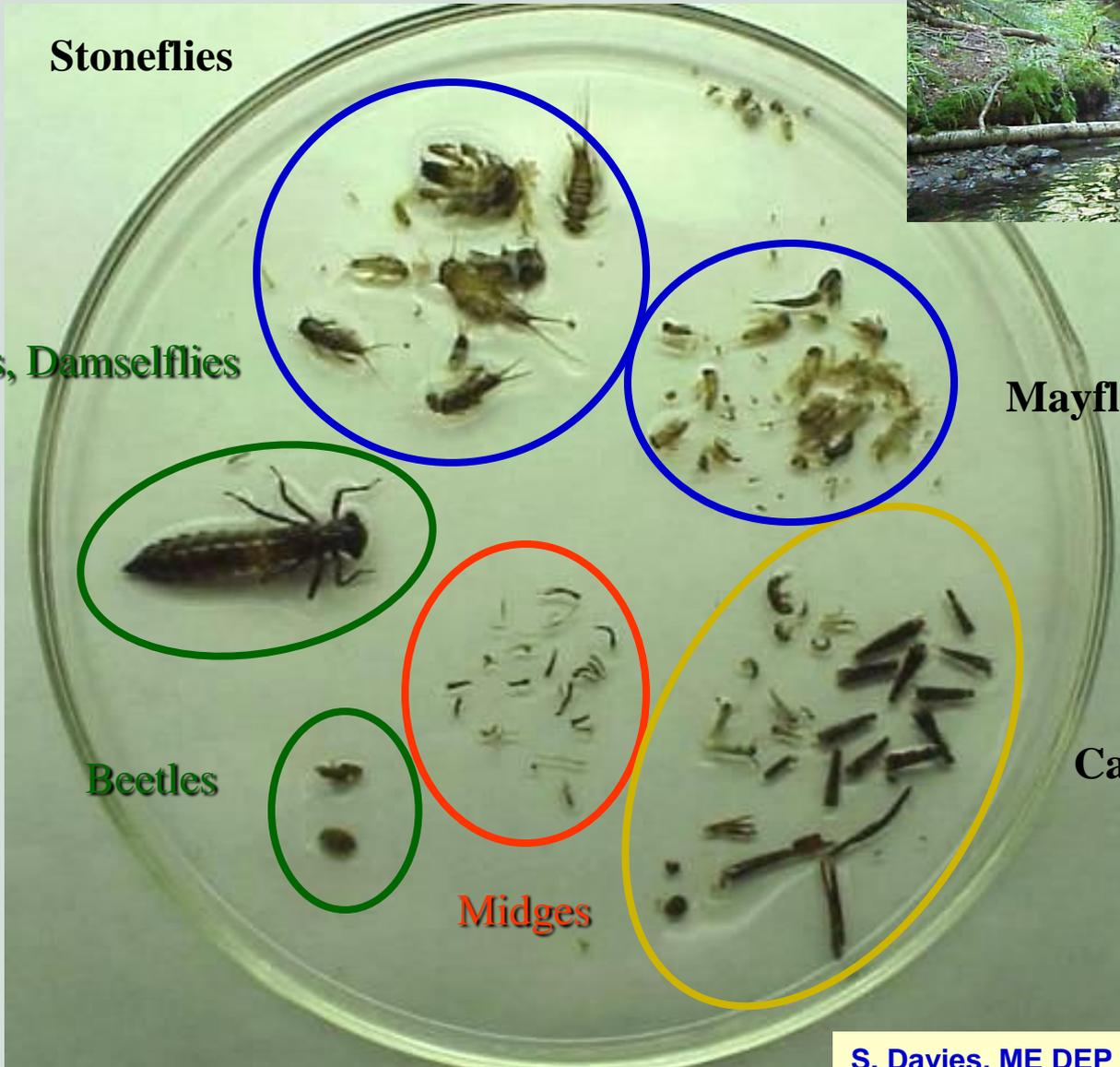


**Pteronarcyidae /  
“Salmonflies”**



**Ephemerellidae / “Hedricksons”  
or “Pale Morning Dun”**

# A Healthy Community



Stoneflies

Dragonflies, Damselflies

Beetles

Midges

Mayflies

Caddisflies

**VSCI SCORE**  
**~70-80**

1 inch

# Moderately Impacted Community



**Caddisflies**

**Crane flies**

**Non-insects**

**Beetles**

**Midges**

**Stoneflies**

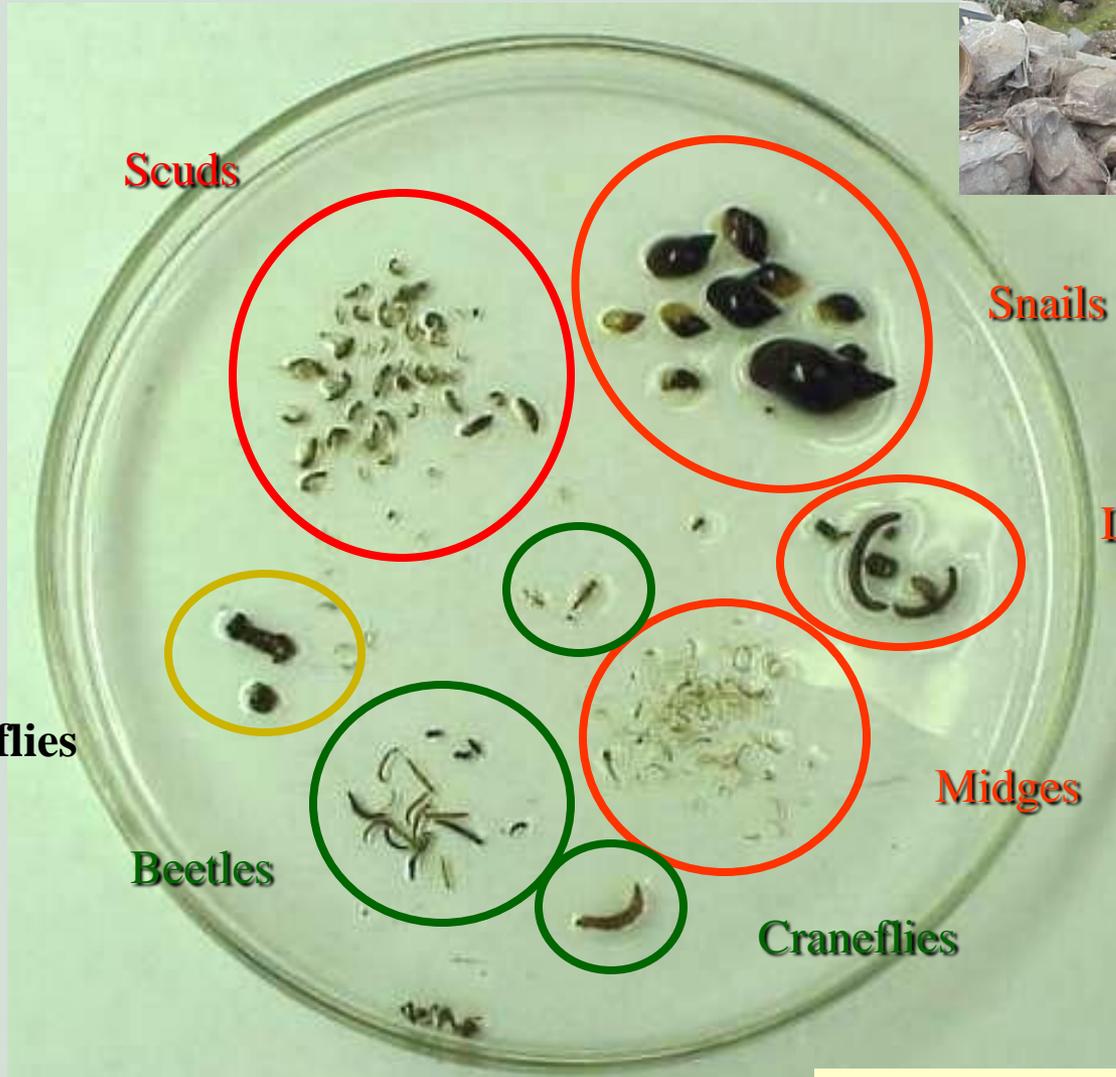
**Blackflies**

**Mayflies**

**VSCI SCORE  
~50-65**

1 inch

# Severely Impacted Community



**VSCI SCORE**  
**<40 ☹️**

1 inch

# DEQ Water Programs: What does it all mean?

- Water monitoring and biomonitoring data is compared to VA's Water Quality Standards
  - Numerical: 235 E.Coli colony forming units/100 mL water
  - Narrative: "All state waters shall be free from substances ... harmful to human, animal, plant, or aquatic life."
- Those stream segments that do not meet Water Quality Standards, are listed on the "Dirty Waters" List (303(d)/305(b) Integrated Report)

# What is a TMDL?



# Current Sediment entering Stream

*Unhealthy Stream*

■ Runoff

Clean-up Plan,  
Public  
Participation,  
Implementation

■ Runoff (Load Allocation)

■ Permits (Wasteload Allocation)

■ Margin of Safety

Reduced Sediment Load  
to Stream:  
**TMDL**

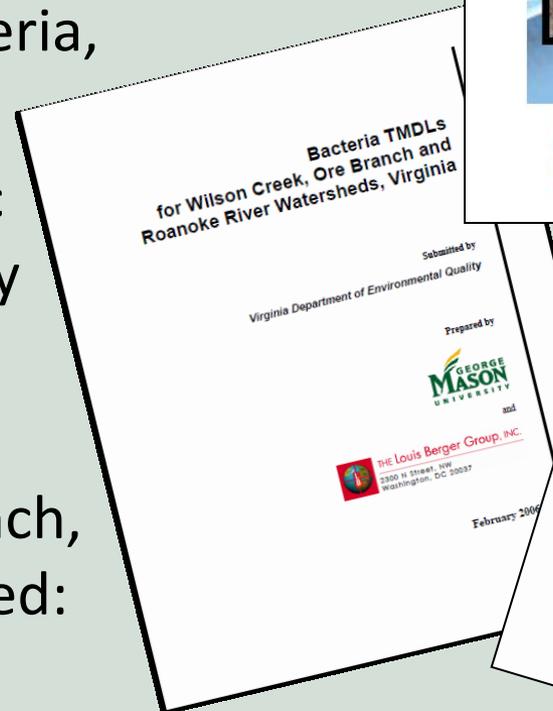
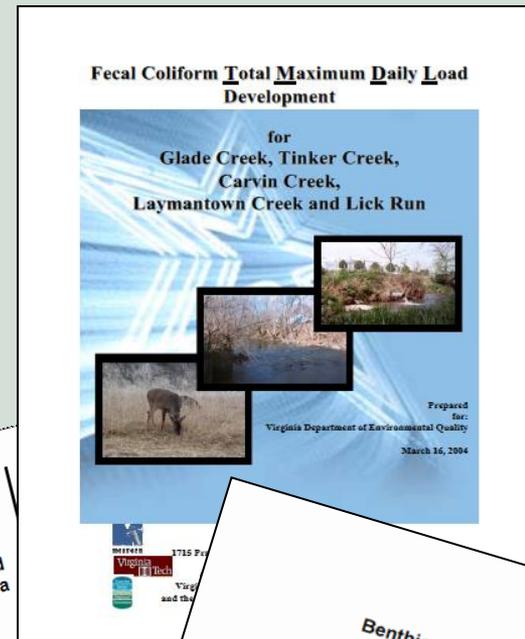
*Healthy Stream*

**What is a TMDL?**

# Roanoke River Watershed TMDLs

## TMDL Development in the Roanoke River Watershed:

- Glade Creek, Tinker Creek, Carvin Creek, Laymantown Creek, & Lick Run: Bacteria, 2004
- Roanoke River: Aquatic invertebrate community impairment (caused by sediment), 2006
- Wilson Creek, Ore Branch, Roanoke River watershed: Bacteria, 2006



# Roanoke River Clean up Plan

- A “road map” to implement the sediment and bacteria reductions called for in the Total Maximum Daily Load (TMDL) studies
- The Clean up Plan includes
  - List of corrective actions, associated costs and benefits needed to meet the bacteria & sediment TMDLs
  - Measurable goals and milestones and the date of expected achievement of water quality objectives



# Roanoke River Watershed Clean up Plan: Potential Control Actions

*VISIT THE ROANOKE CO., ROANOKE CITY, SALEM, & VDOT EXHIBITS!*

## 1. Controls at the Source

**Pollution Prevention:** Sanitary Sewer Overflows, Illicit Discharges, Septic Systems, Improper Pet Waste Disposal

## 2. In Subwatershed Drainage

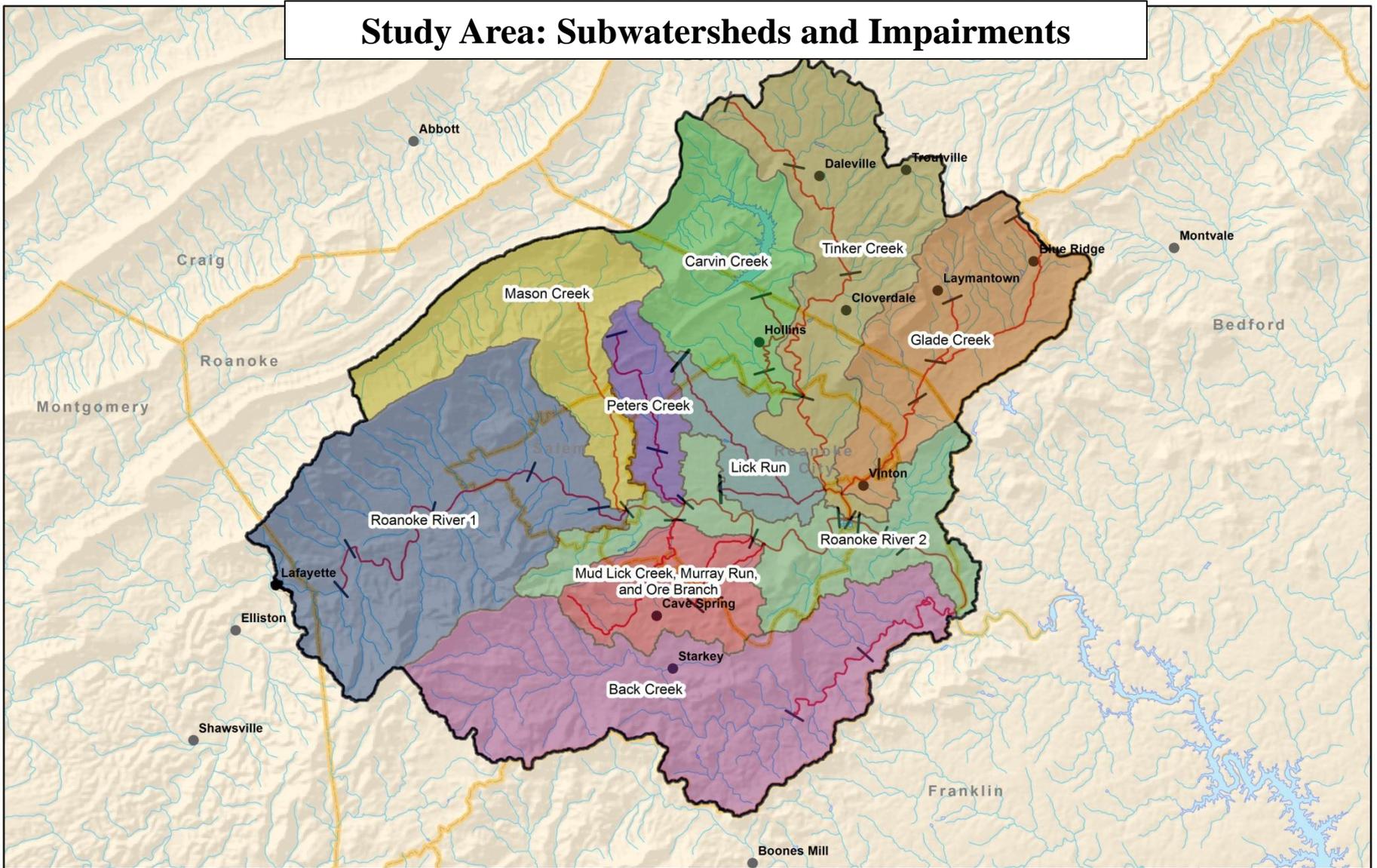
**Mitigation/Control Measures:** Riparian buffers, Exclusion of livestock from streams, Rotational grazing, Waste storage facilities, Cover crops, Streambank stabilization, Grass filter strips, Stormwater controls, Low Impact Development (LID) Measures

## 3. Outreach/Education/Signage

**Indirect Measures:** General outreach regarding NPS pollution, directed outreach like Pet-waste campaigns, Signage

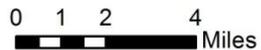


# Study Area: Subwatersheds and Impairments



## Legend

- Impaired Segments
- Study Area
- County
- Waterbodies
- Streams and Rivers
- Cities
- 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



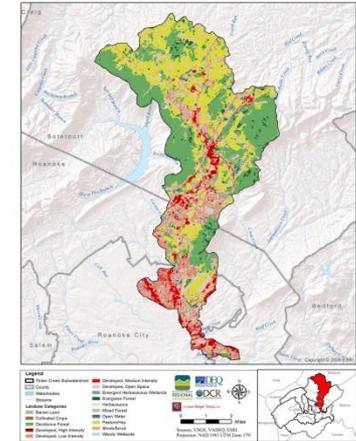
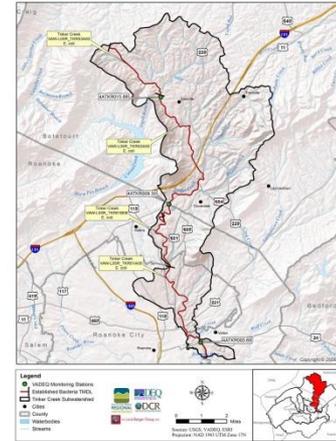
## VA INDEX MAP



# Review of the TMDL Studies

VISIT THE LOUIS BERGER GROUP EXHIBIT!

- Subwatershed basis
- Impairments
- Land Use Distribution
- Existing Conditions
- Recommended Load Reductions by Source
- Existing controls for pollution
- Potential Implementation Actions



Impairment Summary				
Assessment Unit	Stream Name	Length (miles)	Boundaries	Cause
VAW-LOS_R_TK01A00	Tinker Creek	5.34	Tinker Creek mainstem from its confluence with the Roanoke River upstream to the mouth of Carvin Creek	Eisenerichia coli
VAW-LOS_R_TK01B06	Tinker Creek	6.54	Tinker Creek mainstem from the Carvin Creek mouth upstream to the confluence of Duffalo Creek	Eisenerichia coli
VAW-LOS_R_TK02A00	Tinker Creek	4.34	Tinker Creek mainstem from the mouth of Duffalo Creek upstream to the Roanoke City diversion tunnel located just upstream of the USGS stream gaging station	Eisenerichia coli
VAW-LOS_R_TK03A00	Tinker Creek	3.12	Tinker Creek mainstem from the Roanoke City diversion tunnel to Carvin Cove on upstream to its headwaters	Eisenerichia coli

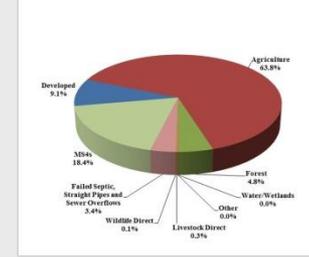
Land Use Distribution (NLCD 2006)		
Land Use Category	Area	
	Acres	Percent
Developed	9,171.3	35.8%
Agriculture	7,245.6	28.3%
Forest	9,068.3	35.4%
Water/Wetlands	50.5	0.2%
Other	58.6	0.2%
<b>Total</b>	<b>25,594.4</b>	<b>100.0%</b>

Land Use/Source	Total Annual <i>E. coli</i> Loads (cfu/yr)		Percent Reduction (%)
	Existing Load	Allocation Load	
	<b>Land Based Non-point</b>		
Developed	5.04E+14	7.87E+12	98.4%
Agriculture	3.54E+15	5.57E+12	99.8%
Forest	2.68E+14	1.06E+13	96.1%
Water/Wetlands	7.68E+11	3.02E+10	96.1%
Other	1.57E+12	2.47E+10	98.4%
<b>Direct Non-point</b>			
Livestock Direct	1.85E+13	0.00E+00	100.0%
Wildlife Direct	4.12E+12	1.05E+12	75.0%
Failed Septic, Straight Pipes and Sewer Overflows	1.91E+14	0.00E+00	100.0%
<b>Point Source</b>			
MS4s	0.00E+00	0.00E+00	0.0%
	1.02E+15	1.62E+13	98.4%
<b>Total</b>	<b>5.55E+15</b>	<b>4.12E+13</b>	<b>99.3%</b>

Existing BMPs - Agricultural and Stormwater			
Agricultural BMP	Count	Acres Treated	Streamlength Protected (ft)
CRFP Grazing land protection	1	1.7	763
CRFP Riparian Forest Buffer Planting	3	9.0	N/A
Harvestable Cover Crop	1	47.4	N/A
Nutrient Management Plan Implementation and Record Keeping	3	36.0	N/A
Permanent Vegetative Cover on Cropland	2	10.1	N/A
Protective cover for specialty crops	1	13.7	N/A
Riparian Buffer Rent	3	9.0	N/A
Small Grain cover crop for Nutrient Management	24	326.4	N/A
Stream Exclusion With Grazing Land Management	6	174.9	2,913
Streambank protection (Geococ)	1	6.0	5,600
<b>Total</b>	<b>45</b>	<b>634</b>	<b>12,276</b>

Stormwater BMP		
	Count	Reported Area Treated* (acres)
Detention Pond	27	353.0
Retention Pond	6	20.4
Infiltration Basin	3	Not Listed
Porous Pavement	1	0.2
Underground Detention	2	2.2
<b>Total</b>	<b>39</b>	<b>375.8</b>

\*Not all BMPs reported area treated



- Potential Implementation Actions to Reduce Bacteria
- Improved Pasture Management
  - Waste Storage Facilities
  - Livestock Exclusion from Streams
  - Riparian Buffer Creation/Expansion
  - Stormwater Controls
  - Septic System Repair/Replacement
  - Educational Programs
  - Pet Waste Disposal Systems

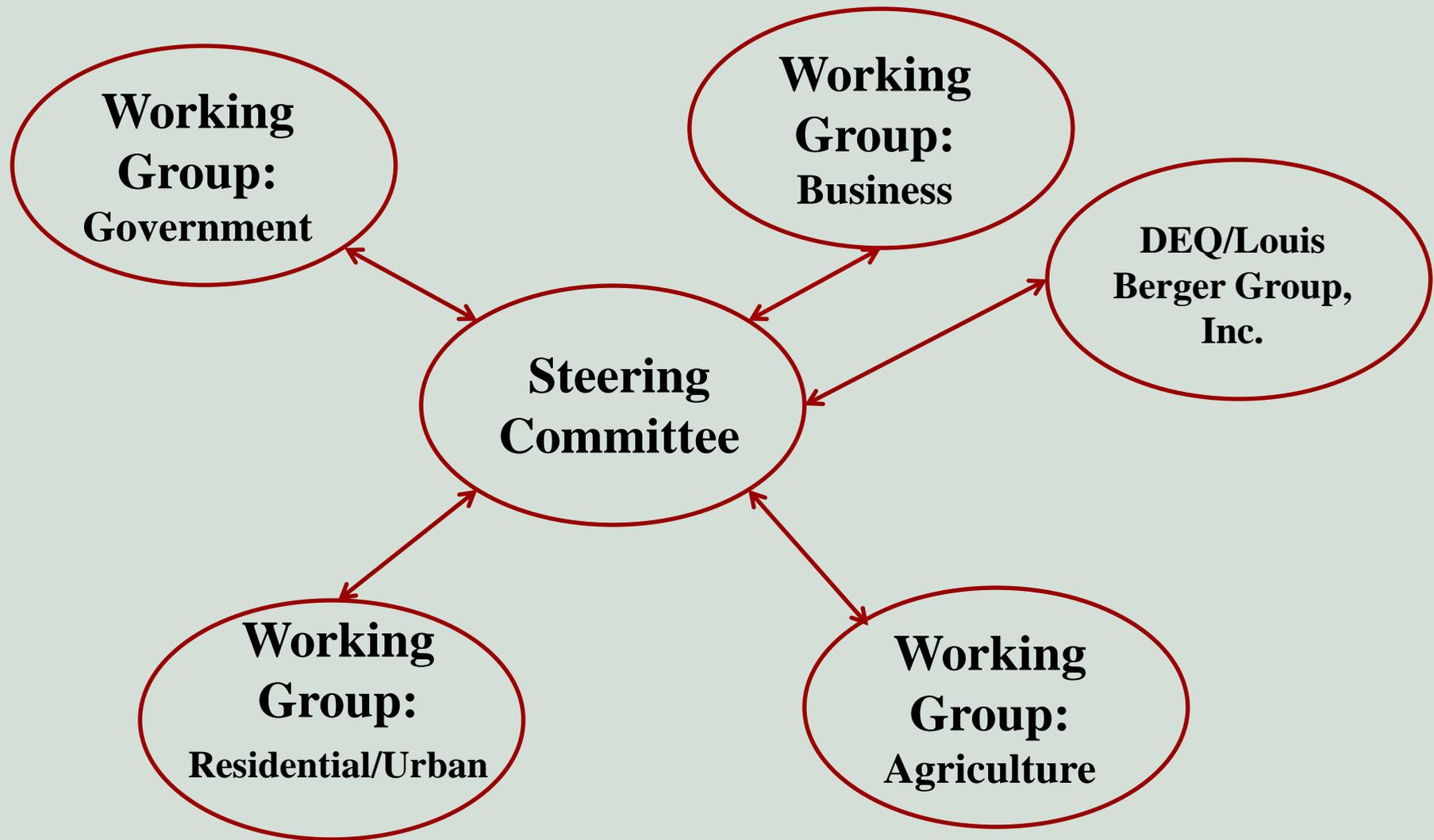
Tinker Creek Subwatershed - Upper



# Identification of Control Actions

- Develop aerial imagery maps for each subwatershed section
- Include existing controls
- Identify potential/preliminary controls
- Working Group Members identify and recommend additional controls
- When needed, perform site visits

# Roanoke River Watershed Clean up Plan: How YOU can get involved!



# Steering Committee

- Includes:
  - Agencies, local government, SWCD, Stakeholders, Working Group Representatives
- Meet: 2-3 meetings during plan development
- Responsibilities
  - Review technical data
  - Assess input from working groups
  - Address community concerns/suggestions
  - Guide the process
    - Are we getting “representative” inputs?
    - How can the process be improved?

# Working Groups

- Include:
  - Agriculture
  - Urban/Residential
  - Government
  - Business
- Meet
  - 1-2 times each



# Government Working Group

- Responsibilities:
  - Identify funding sources
  - Identify available technical resources
  - Identify appropriate “measurable” goals and timelines
  - Identify existing applicable regulatory controls
  - Identify potential parties to be responsible for implementation

# 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 producers



# Residential Working Group

- Responsibilities
  - Identify possible constraints to implementation
  - Identify methods of outreach to homeowners
  - Identify alternative funding sources/partnerships
  - Review implementation strategies from a homeowner's perspective



# Business Working Group

- Responsibilities
  - Identify possible constraints to implementation
  - Identify methods of outreach to local business community
  - Identify alternative funding sources/partnerships
  - Review implementation strategies from the business community perspective



# Next Steps

- Working Groups
  - Sign up sheets at the Registration Table
  - Upcoming Meetings (DEQ Office, 3019 Peters Creek Road):
    - Business Working Group: 6/20, 2:00 p.m.
    - Residential Working Group: 6/20, 7:00 p.m.
    - Agricultural Working Group: 6/20, 7:00 p.m.
    - Government Working Group: TBD
    - Steering Committee: TBD
  
- Public Comment Period “ends”: 7/11/13

**April 10, 2013**

**Kick-Off Meeting:**

Introduce local agencies, governments, and NGOs to Implementation Process

**June 20th**  
**AG, Resid., Business Working Group Meetings; Gov't WG July date TBD:**

Discuss potential best management practices and Outreach activities

**September**  
**Working Group Meetings:**

Discuss implementation scenarios, cost, funding, and monitoring

**Mid-November**  
**Final Public Meeting:**

Present Draft Clean up Plan to Citizens of the watersheds!

**APRIL/MAY**

**JUNE/JULY**

**AUGUST**

**SEPTEMBER**

**OCTOBER/NOVEMBER**

**June 11th**  
**Open House:**

Introduce Clean up Plan to the Community, Working Group Sign up

**August**  
**Steering Committee Meeting:**

Prioritize Best Management Practices, discuss funding sources & timeline

**Late Sept/Early Oct.**

**Steering Committee Meeting**

Finalize Best Management Practices & timeline

Public Comment period ends 30 days after Final Public Meeting.

**NEXT STEP:**  
**Finalize Clean up Plan and begin implementing Best Management Practices!**

# Project Timeline

# Roanoke River Clean up Plan Contacts



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