

March 3, 2015

1

# South Fork Holston River Watershed Total Maximum Load (TMDL) *First Public Meeting*



Chilhowie, VA  
March 3, 2015



Total Maximum Daily Load (TMDL) for the South  
Fork Holston River Watershed

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THROUGH *Science* AND *Engineering*

# Why are we here?

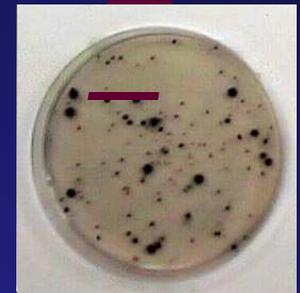
## ■ High Fecal Bacteria in the South Fork Holston River Watershed

### ○ What's Fecal Bacteria?

- Bacteria associated with feces from warm blooded animals (fecal coliform, *E. coli*)

### ○ Why should we care?

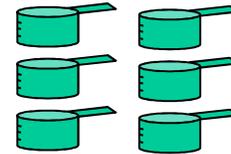
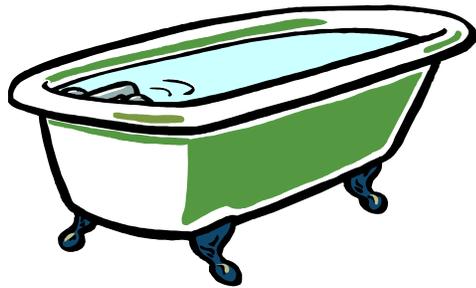
- Swimming/Recreation Use
- Pathogens (including some strains of *E. coli*)
- Parasites



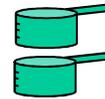
### ○ Water Quality Standards for Primary Contact Recreation

- Swimming/Recreation Use
- Instantaneous: 235 cfu/100 ml *E. coli*
- Monthly Geometric Mean: 126 cfu/100 ml *E. coli*

# How much waste fouls a bathtub?



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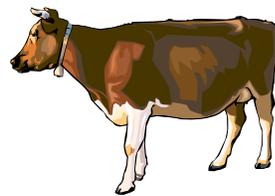


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 = 1 cup

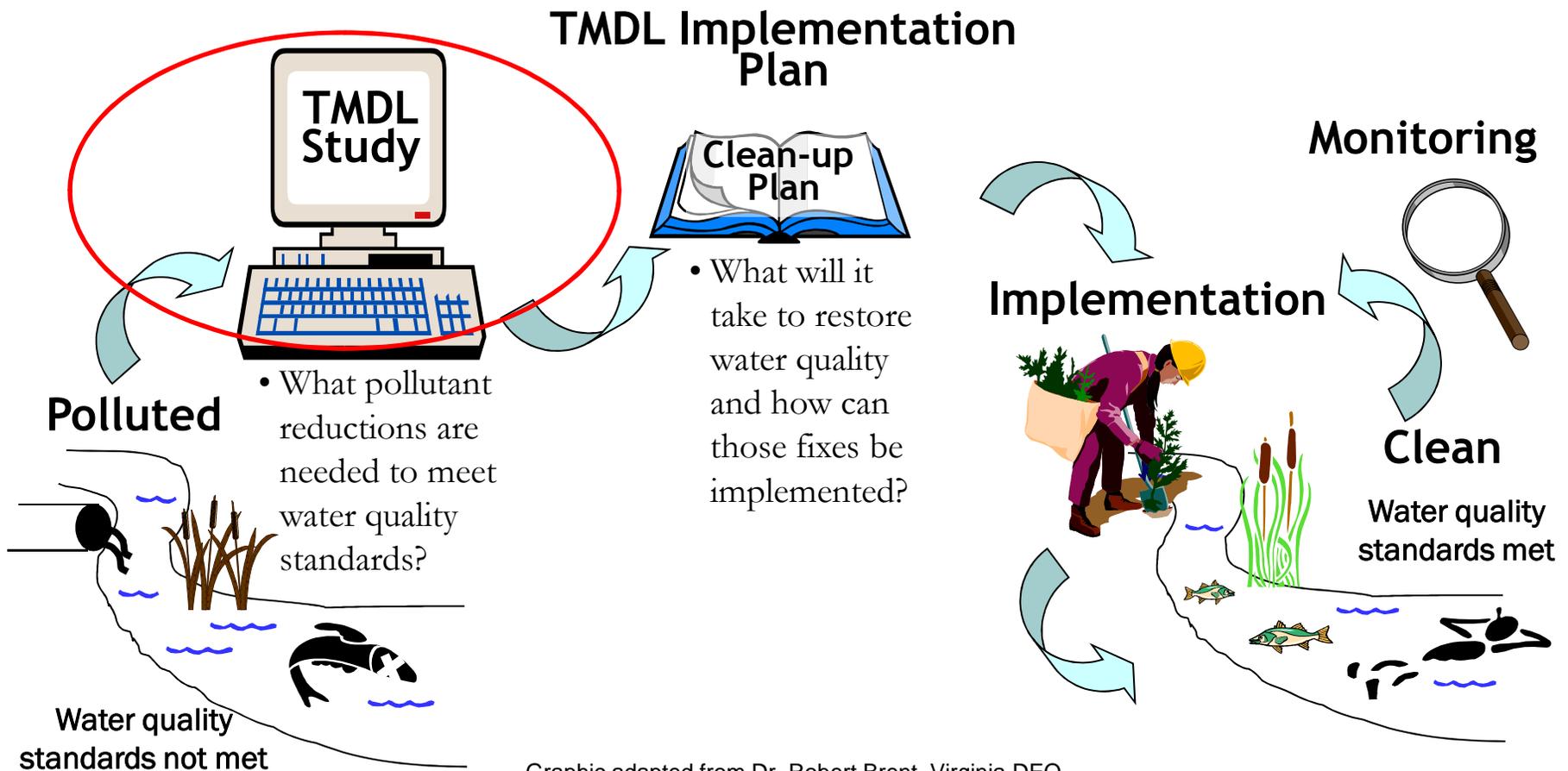
 = 1 Tbsp

 = 1 tsp

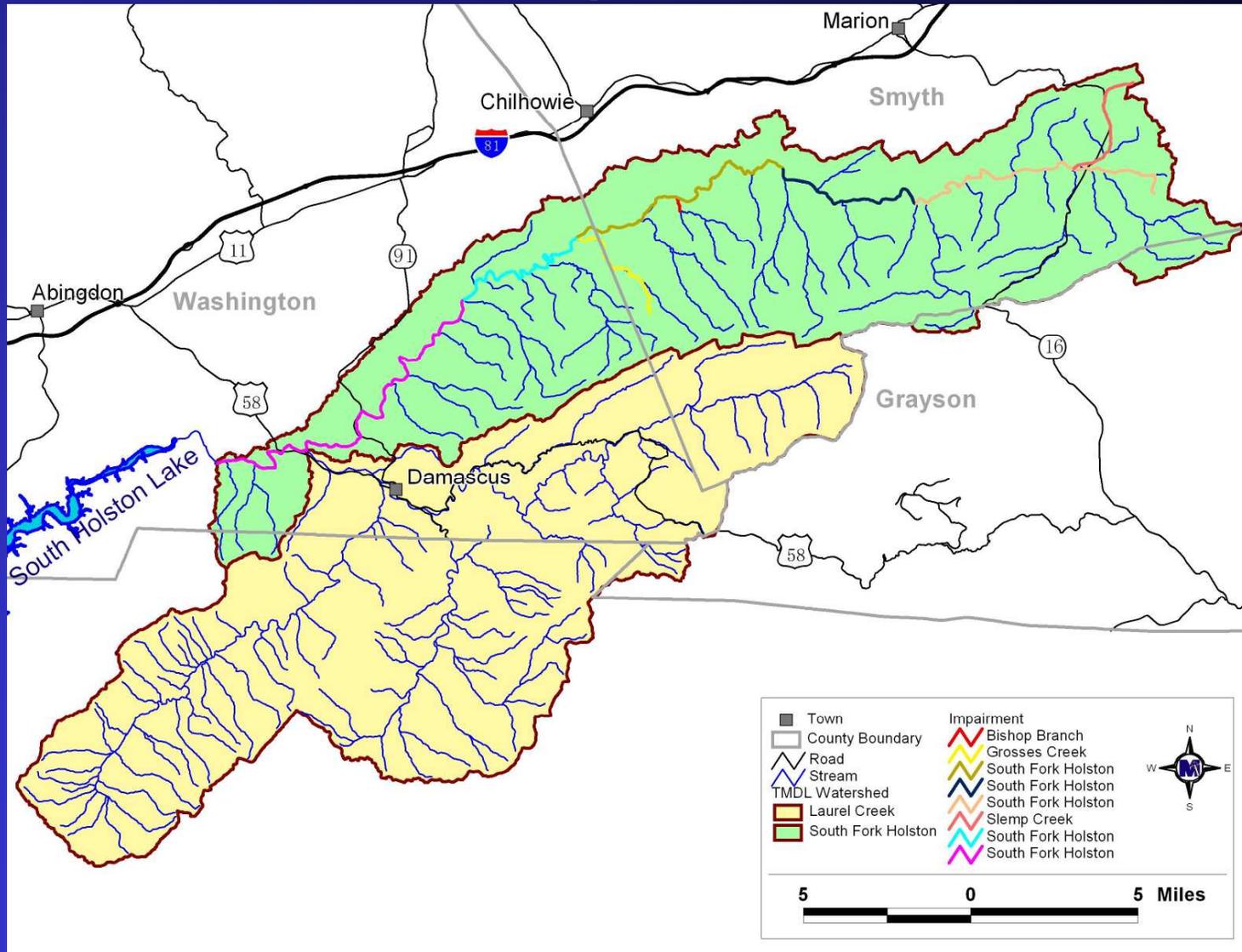


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# Overview of TMDL Process



# Study Area



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# South Fork Holston River Watershed Study Area Considerations

- Approximately one third of the drainage area lies within the State of Tennessee.
- The main tributaries draining into Virginia from Tennessee are Beaverdam Creek and Laurel Creek.
- An *E. coli* bacteria TMDL has been developed and approved by the USEPA (9/25/2006) for an impaired segment on Laurel Creek in Tennessee.
- In the development of this TMDL the land uses, hydrology and bacteria sources from Tennessee will be considered.

# Impaired Streams in the South Fork Holston River TMDL Watershed

Stream Name Impairment ID	Impairment(s) Contracted	Initial Listing Year	2012 River Miles	2012 Listing Violation%	Impairment Location Description
<b>South Fork Holston River</b> VAS-O01R_SFH03A00	<i>E. coli</i>	2010	9.44	25 & 16 %	From the headwaters downstream to Barton Creek confluence.
<b>Slemp Creek</b> VAS-O01R_SLM01A02	<i>E. coli</i>	2010	3.99	66 %	From its headwaters downstream to the confluence with the South Fork Holston River.
<b>Bishop Branch</b> VAS-O01R_BSC01A02	<i>E. coli</i>	2010	0.41	58 %	From the Parker Branch tributary downstream to the South Fork Holston River confluence.
<b>Grosses Creek</b> VAS-O01R_GRC01A00	<i>E. coli</i>	2010	3.99	58 %	From the headwaters downstream to the confluence with the South Fork Holston River.
<b>South Fork Holston River</b> VAS-O01R_SFH02A00	<i>E. coli</i>	2010	5.09	23 %	From Barton Creek confluence downstream to Rowland Creek confluence.
<b>South Fork Holston River</b> VAS-O01R_SFH01A00	<i>E. coli</i>	2002	8.36	33 %	From Rowland Creek confluence downstream to Grosses Creek confluence.
<b>South Fork Holston River</b> VAS-O02R_SFH01B02	<i>E. coli</i>	2006	6.14	23 %	From Grosses Creek confluence downstream to Rush Creek confluence.
<b>South Fork Holston River</b> VAS-O02R_SFH02A00	<i>E. coli</i>	2004	12.98	33 %	From its confluence with Rush Creek downstream to the South Lake Holston reservoir backwaters.

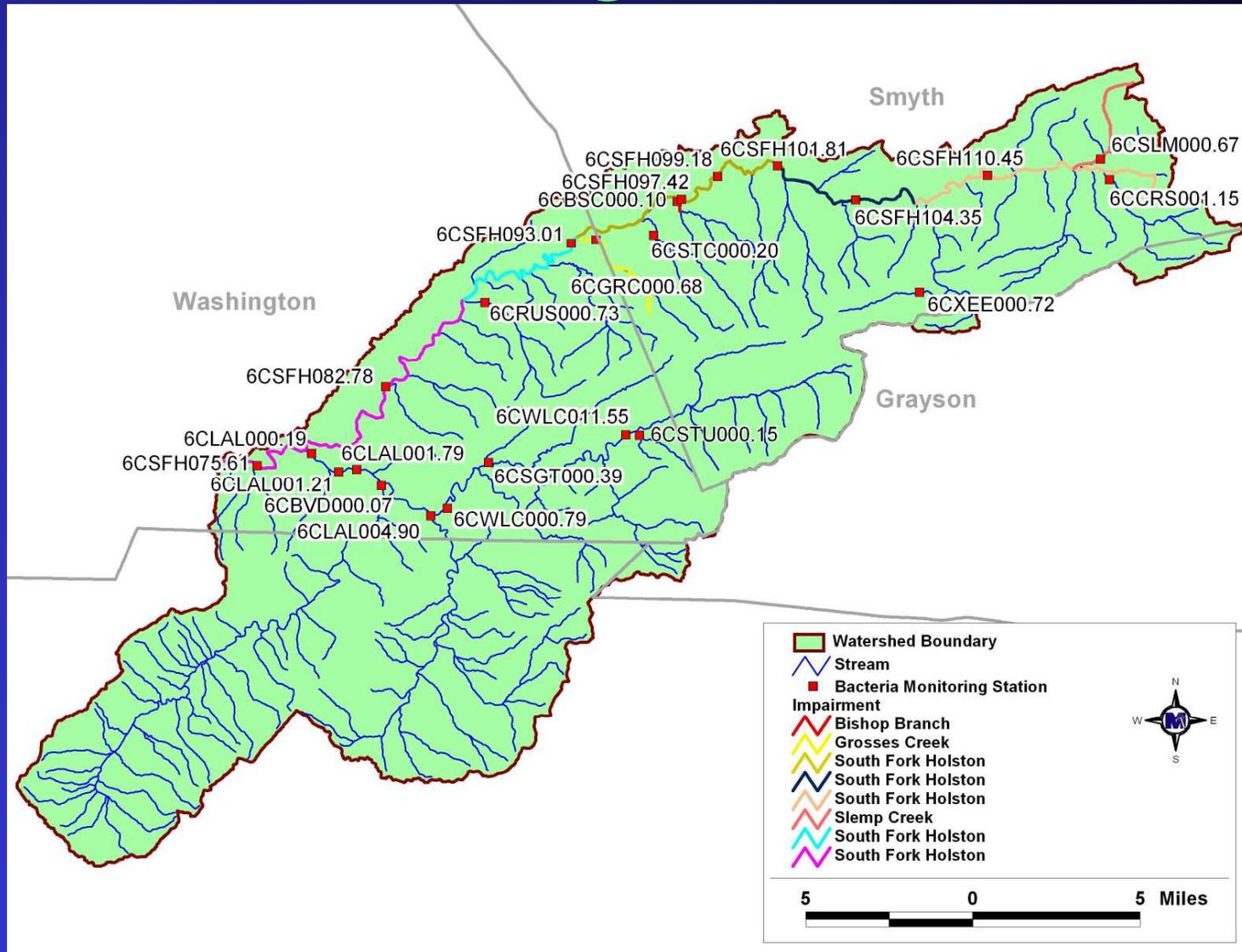


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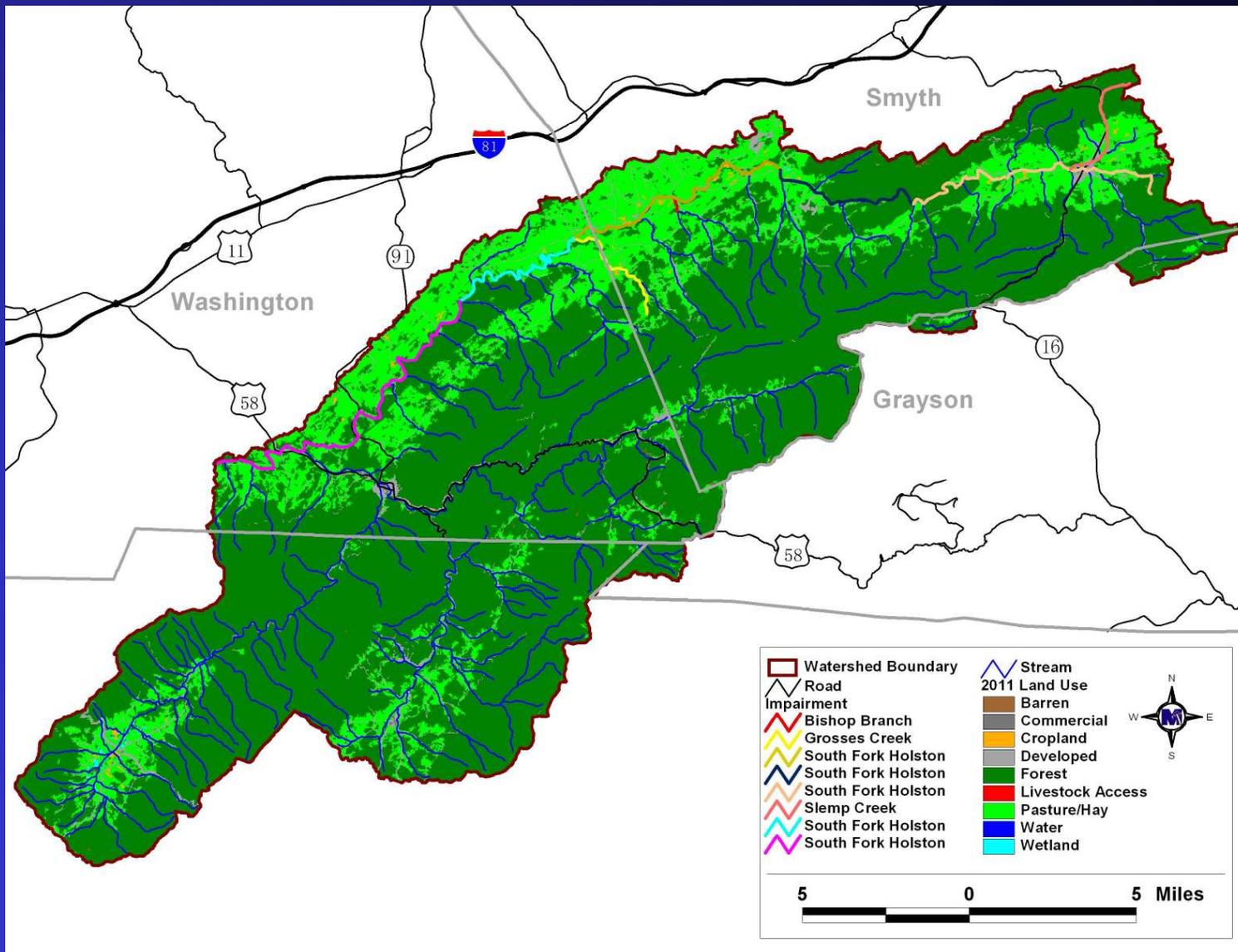
# Monitoring Locations



# Major components of a TMDL

- Monitoring/Listing - Identify Water Quality Problem
  - Monitoring Ongoing
  - Listing Completed by DEQ
- Source Assessment – Locate Potential Sources of Pollutants in Watershed
  - ○ Estimates Presented here – Please validate
- Modeling – Examine the Movement of Pollutants from Land to Water and Direct Inputs to Water
- Allocation/TMDL – Use a Computer Model to Determine the Load Reductions Necessary to Achieve Water Quality Goals

# Land Use



# Land Use

Land Use	Lower South Fork Holston		South Fork Holston	
	(acres)	(%)	(acres)	(%)
Water	1,040	1%	1,079	1%
Developed	3,342	3%	3,119	3%
Commercial	64	< 1%	47	< 1%
Barren	57	< 1%	39	< 1%
Forest	89,305	87%	61,034	64%
Pasture/Hay	8,921	8%	29,710	31%
Cropland	99	< 1%	308	< 1%
Wetland	148	< 1%	41	< 1%
<b>Total</b>	<b>102,976</b>		<b>95,377</b>	

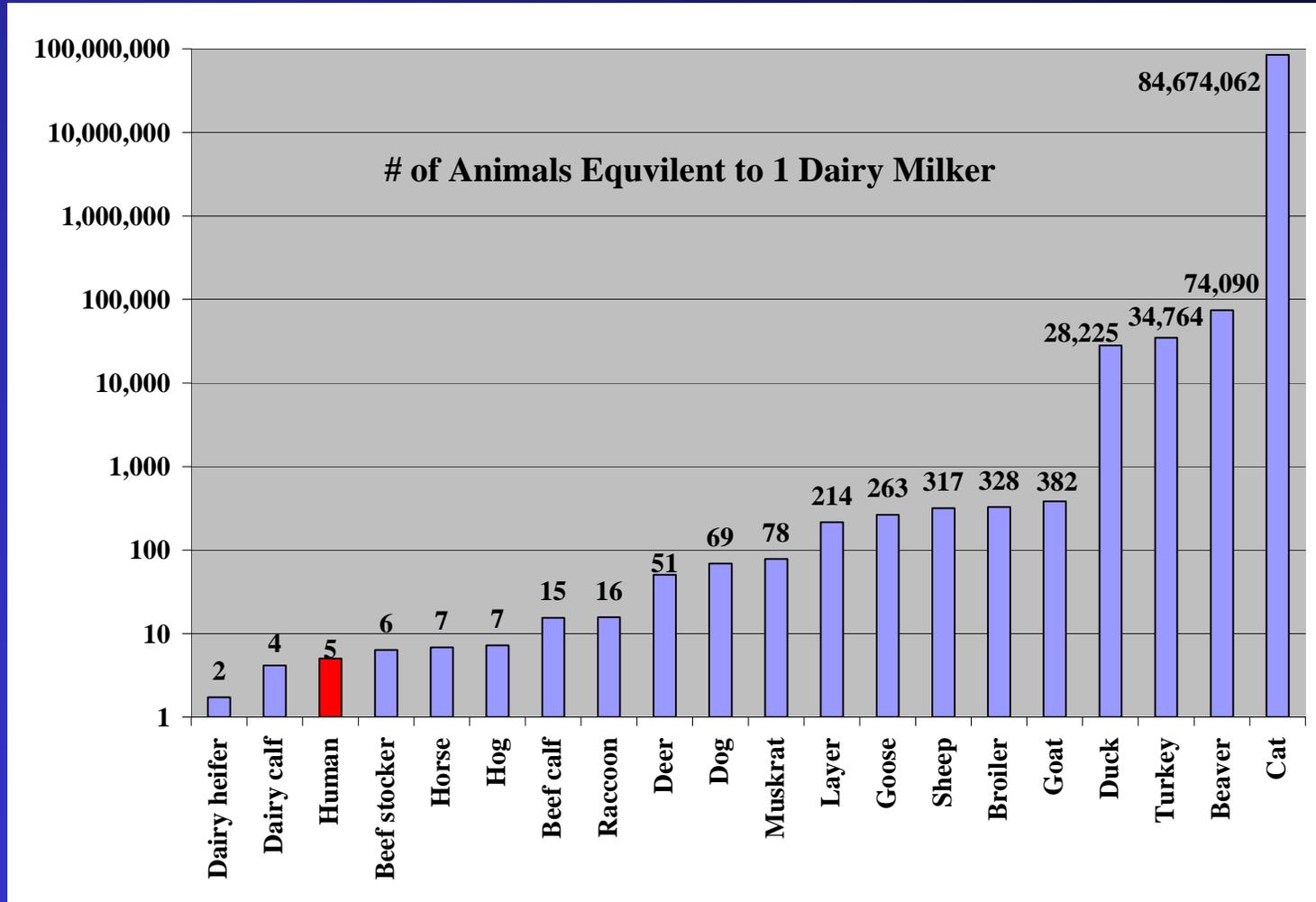


# Source Assessment

- Permitted discharges
  - Wastewater Treatment Facilities
  - Residential Waste Treatment Systems
- Human
  - Failing Septic Systems
  - Straight Pipes
  - ~~Biosolids~~
- Pets
- Livestock
- Wildlife



# Fecal Bacteria Production Comparison



# Permits

- Permitted direct discharges of water and bacteria in the South Fork Holston River Watershed

Permit	Receiving Stream(s)	Facility Name	Permitted for <i>E. coli</i> Control
VA0021130	Damascus WWTP	Holston River, South Fork	Y
VA0022993	USDA - Forest Service - Grindstone Recreation Area	Big Laurel Creek	Y
VA0026778	Washington County Public Schools - Holston High	Holston River, South Fork UT	Y
VAG400*		7 Domestic Permits	Y

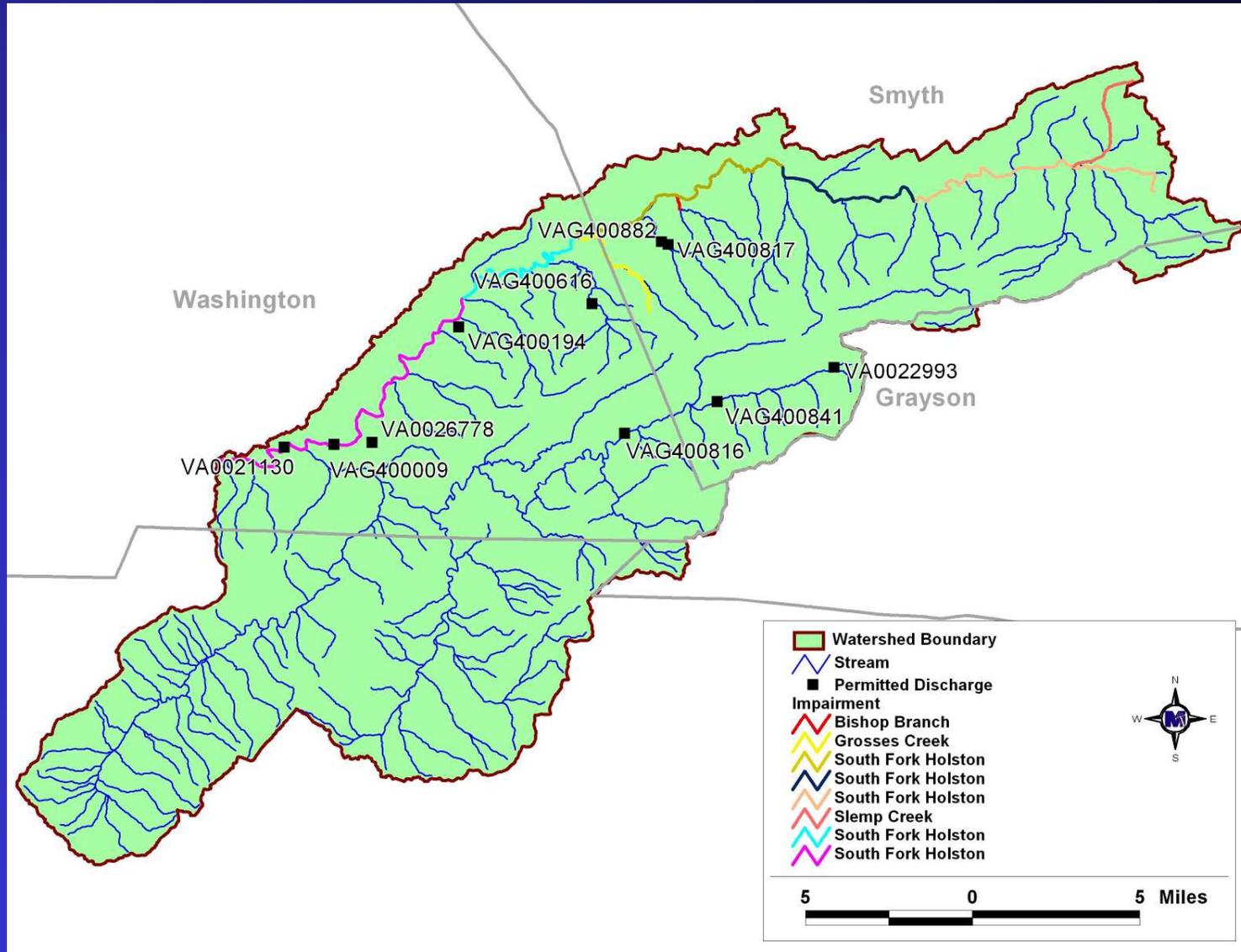
\* Domestic permits are typically permitted for flows 1,000 gpd or less



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# Permits



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# Human Population

- Population, housing units, and onsite treatment system based on U.S. Census
- Septic Systems
  - Failure to soil surface throughout year
  - Lateral movement continuously to stream
- Straight Pipes
  - Direct continuous input into stream



# Human Population in the South Fork Holston River Watershed

TMDL Watershed	Human Population	Housing Units	Homes with Sewer	Homes with Septic	Estimated Homes with Straight Pipes
South Fork Holston River	8,413	4,035	313	3,564	119
Lower South Fork Holston River	5,120	2,954	543	2,233	74
<b>Total</b>	<b>13,533</b>	<b>6,989</b>	<b>856</b>	<b>5,797</b>	<b>193</b>

Based on a 30-yr life for the average septic system, the failure rate is estimated at 3.3%.

191 failing septic systems estimated.



# Pet Population

- Population based on housing units \* Pet Density from Vet Assoc. of America
- Pets can contribute bacteria via
  - Runoff from residential and urban lands
  - Fecal matter washed into streams or wetlands



# Pet Population in the South Fork Holston River Watershed

TMDL Watershed	Dogs	Cats
South Fork Holston River	2,663	2,982
Lower South Fork Holston River	699	783
<b>Total</b>	<b>3,362</b>	<b>3,765</b>

# Livestock Population

- Population based on amount of pasture in watershed and populations from National Ag Statistics
- Livestock can contribute bacteria via
  - Directly to the stream
  - Runoff from pastures and cropland
  - Runoff from loafing lot areas
  - Runoff from manure spread on pastures and cropland



# Livestock Population in the South Fork Holston River Watershed

TMDL Watershed	Beef	Dairy	Chicken	Horse	Mule	Sheep
South Fork Holston River	20,132	1,883	291	511	58	1,152
Lower South Fork Holston River	4,142	87	416	167	24	134
<b>Total</b>	<b>24,274</b>	<b>1,970</b>	<b>707</b>	<b>678</b>	<b>82</b>	<b>1,286</b>



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# Livestock Population in the South Fork Holston River Watershed

TMDL Watershed	Geese	Goat	Guinea	Hog	Llamas	Turkey
South Fork Holston River	0	446	21	33	3	10
Lower South Fork Holston River	0	180	1	5	0	0
<b>Total</b>	<b>0</b>	<b>626</b>	<b>22</b>	<b>38</b>	<b>3</b>	<b>10</b>



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# Wildlife Population

- Population based on habitat area \* population densities from VDGIF.
- VA & USEPA are not proposing elimination of wildlife.
- Reduction of wildlife or changing a natural background condition is not the intended goal of a TMDL.
- Managing overpopulations is an option for local stakeholders.
- VDGIF could be asked to assist with plan



# Wildlife Population in the South Fork Holston River Watershed

TMDL Watershed	Deer	Duck	Goose	Raccoon	Turkey	Muskrat	Beaver	Bear
South Fork Holston River	3,241	93	45	6,628	848	4,452	956	80
Lower South Fork Holston River	3,466	114	57	7,096	908	5,514	1,172	136
<b>Total</b>	<b>6,707</b>	<b>207</b>	<b>102</b>	<b>13,724</b>	<b>1,756</b>	<b>9,966</b>	<b>2,128</b>	<b>216</b>



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# Determining the TMDLs



+

Watershed data



TMDL

# Modeling



# How can you participate?

- Attend meetings
  - Public
  - Send comments
- In the mean time:
  - Dispose of Pet Waste Properly
  - Maintain your Septic System
  - Ask your local SWCD about cost-share practices
  - Join a Local Watershed Group – Volunteer!
  - Plant Native Trees and Shrubs in the Riparian Corridor
  - Perform Citizen monitoring



# What's Next?

- 30 day comment period ends 4/2/2015:
  - Send comments to Martha Chapman, DEQ
- Final Public Meeting
  - 30 day comment period
- TMDL submitted to EPA then SWCB
- On list for Implementation Plan development

*Send Comments To:*

Martha Chapman

TMDL Projects Coordinator

Department of Environmental Quality

[Martha.Chapman@deq.virginia.gov](mailto:Martha.Chapman@deq.virginia.gov)

Phone: (276) 676-4845

Fax: (276) 676-4899



# Questions ???



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# Extra Information



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# E. coli Bacteria Data in the South Fork Holston River Watershed

Stream	Station	Date	Count	Min	Max	Mean	Median	Standard Deviation	Violation <sup>1</sup> %
Beaverdam Creek	6CBVD000.07	1/05 - 12/13	39	25	2,000	110	25	317	5.1%
Bishop Branch	6CBSC000.10	1/07 - 12/12	24	25	2,000	937	788	798	75.0%
Cressy Creek	6CCRS001.15	1/07 - 5/14	12	25	400	56	25	108	8.3%
Grosses Creek	6CGRC000.68	1/07 - 12/12	24	25	2,000	483	315	508	62.5%
Laurel Creek	6CLAL000.19	6/11	1	20	20	20	NA	NA	0.0%
Laurel Creek	6CLAL001.21	1/05 - 12/12	27	25	1,500	120	50	280	3.7%
Laurel Creek	6CLAL001.79	3/07	1	10	10	10	NA	NA	0.0%
Laurel Creek	6CLAL004.90	1/05 - 12/13	39	25	1,200	129	75	194	7.7%

<sup>1</sup> Based on the *E. coli* instantaneous standard of 235 cfu/100ml.



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# E. Coli Bacteria Data in the South Fork Holston River Watershed

Stream	Station	Date	Count	Min	Max	Mean	Median	Standard Deviation	Violation <sup>1</sup> %
Rush Creek	6CRUS000.73	1/09	1	25	25	25	NA	NA	0.0%
South Fork Holston River	6CSFH075.61	1/05 - 6/14	69	25	2,000	164	75	298	17.4%
South Fork Holston River	6CSFH082.78	5/10	1	10	10	10	NA	NA	0.0%
South Fork Holston River	6CSFH093.01	1/07 - 12/12	24	25	2,000	236	100	423	16.7%
South Fork Holston River	6CSFH097.42	3/05 - 6/14	68	25	1,500	179	100	241	23.5%
South Fork Holston River	6CSFH099.18	5/2010	1	20	20	20	NA	NA	0.0%

<sup>1</sup> Based on the *E. coli* instantaneous standard of 235 cfu/100ml.



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# *E. Coli* Bacteria Data in the South Fork Holston River Watershed

Stream	Station	Date	Count	Min	Max	Mean	Median	Standard Deviation	Violation <sup>1</sup> %
South Fork Holston River	6CSFH101.81	1/07 - 12/12	24	25	1,300	151	88	255	8.3%
South Fork Holston River	6CSFH104.35	3/05	1	10	10	10	NA	NA	0.0%
South Fork Holston River	6CSFH110.45	1/07 - 12/12	24	25	2,000	276	163	414	29.2%
Straight Branch	6CSGT000.39	1/09 - 12/10	12	25	50	27	25	7	0.0%
Slemp Creek	6CSLM000.67	1/07 - 12/12	16	25	2,000	554	350	638	50.0%
St. Clair Creek	6CSTC000.20	1/14 - 6/14	7	20	2,000	335	25	736	14.3%

<sup>1</sup> Based on the *E. coli* instantaneous standard of 235 cfu/100ml.



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# E. Coli Bacteria Data in the South Fork Holston River Watershed

Stream	Station	Date	Count	Min	Max	Mean	Median	Standard Deviation	Violation <sup>1</sup> %
Sturgill Branch	6CSTU000.15	3/08	1	10	10	10	NA	NA	0.0%
Whitetop Laurel Creek	6CWLC000.79	1/05 - 12/10	15	25	450	70	25	111	6.7%
Whitetop Laurel Creek	6CWLC011.55	1/09 - 12/10	12	25	320	129	125	100	16.7%
X-Trib Hurricane Creek	6CXEE000.72	4/06 - 12/12	12	10	25	24	25	4	0.0%

<sup>1</sup> Based on the *E. coli* instantaneous standard of 235 cfu/100ml.



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