Lower Clinch River and Cove Creek Area

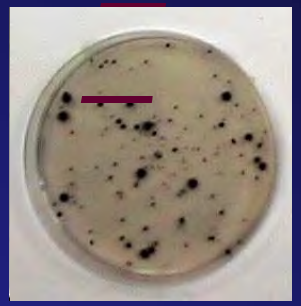
Total Maximum Daily Load (TMDL)

First Public Meeting

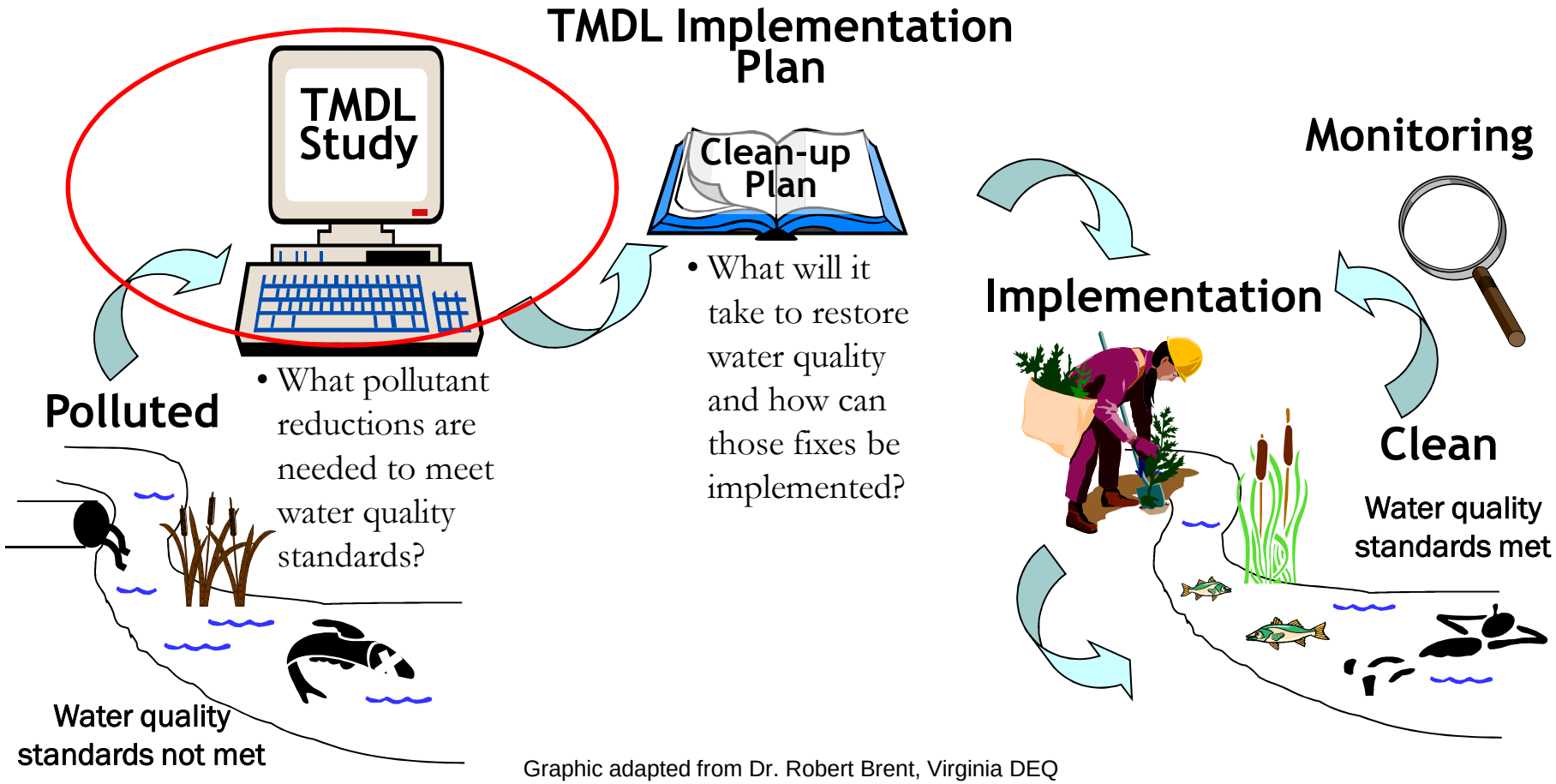
Norton Community Center
Norton, VA
July 11, 2013

Why are we here?

- High Fecal Bacteria in the Lower Clinch River and Cove Creek Area
  - 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*



Overview of TMDL Process



Graphic adapted from Dr. Robert Brent, Virginia DEQ

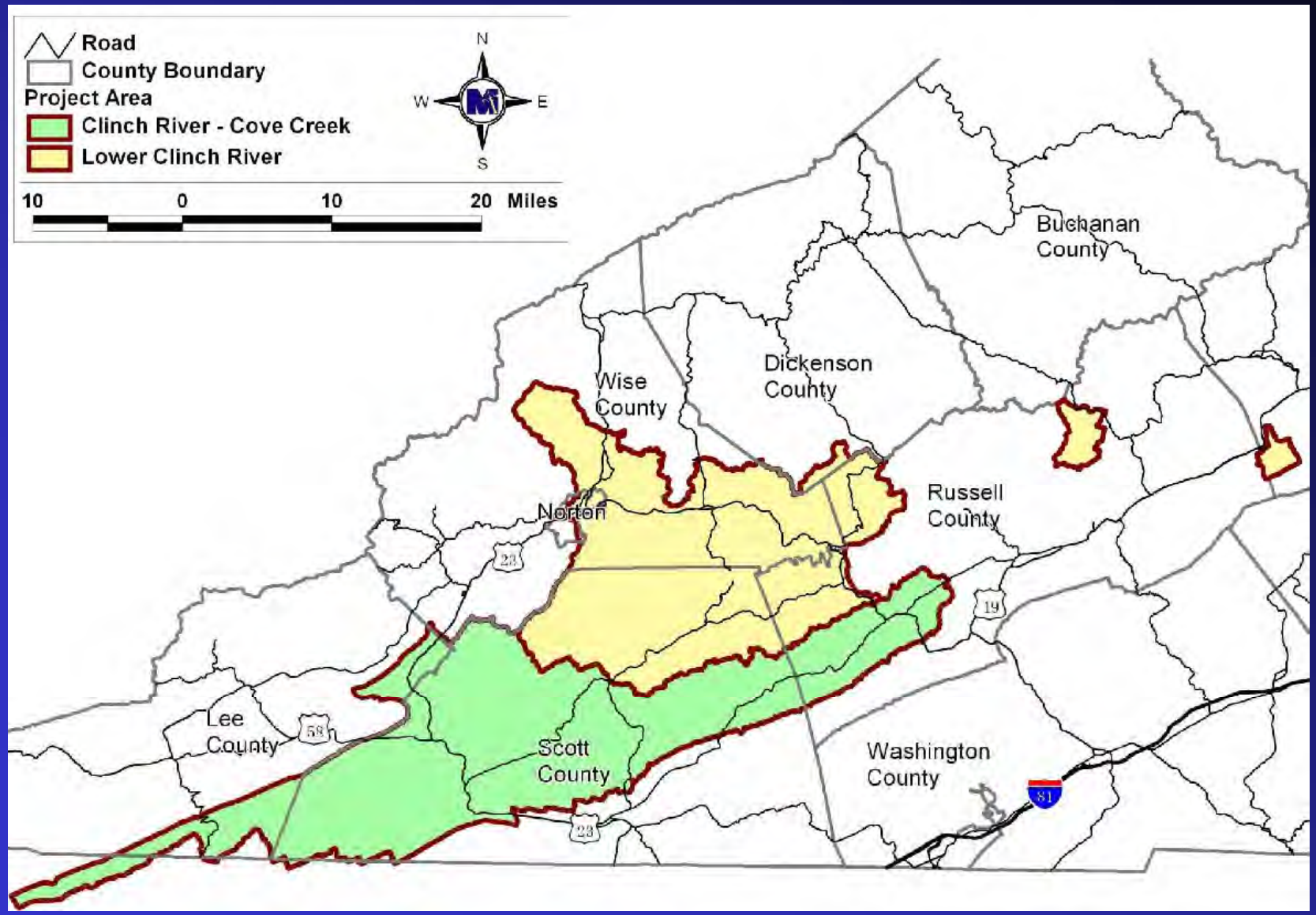
Impaired Streams in the Lower Clinch River Watershed

Stream Name Impairment ID	**Impairment(s) Contracted**	**Initial Listing Year**	**2010 River Miles**	**2010 Listing Violation%**	**Impairment Location Description**
Bark Camp Branch VAS-P12R_BAR01A02	pH Benthic	2010 2004	3.01	pH VASCI <60	From its headwaters downstream to its confluence with Stony Creek.
Bear Creek VAS-P11R_BER01A98	*E. coli*	2008	1.83	16 EC	From its confluence with Yellow Creek downstream to its confluence with the Guest River.
Clinch River VAS-P09R_CLN01A00	E. coli	2004	6.07	11 EC	From the Little Stony Creek confluence downstream to the Staunton Creek confluence.
Fall Creek VAS-P09R_FLC01A02	*E. coli*	2006	2.95	16 EC	From its confluence with Beaver Hollow downstream to the Clinch River confluence.
Laurel Creek VAS-P05R_LUC01A10	Benthic	2012	3.39	VASCI <60	Flows north draining the Clinch Mountain spur south of Wardell.
Little Stony Creek VAS-P09R_LSR01A02	*E. coli*	2008	2.64	16 EC	From the Star Branch confluence downstream to the Clinch River confluence.
Russell Creek VAS-P09R_RUS01A06	*E. coli*	2008	5.06	18 EC	From its headwaters downstream to the Clinch River confluence.
Stony Creek VAS-P12R_SNY01A04	*E. coli*	2008	5.04	22 EC	From Greens Chapel downstream to the Clinch River confluence.
Staunton Creek VAS-P09R_SUT01A02	*E. coli*	2006	9.37	16 EC	From Stone Mountain downstream to its confluence with the Clinch River.
Thompson Creek VAS-P07R_TMP02A10	Benthic	2010	3.31	VASCI <60	From the confluence of an unnamed tributary east of Coulwood upstream 3.25 miles.
Guest River VAS-P11R_GUE01A00	*E. coli*	2006	4.07	18 EC	Orchard Creek confluence downstream to Clinch River confluence near Bangor, WQS Section 2.

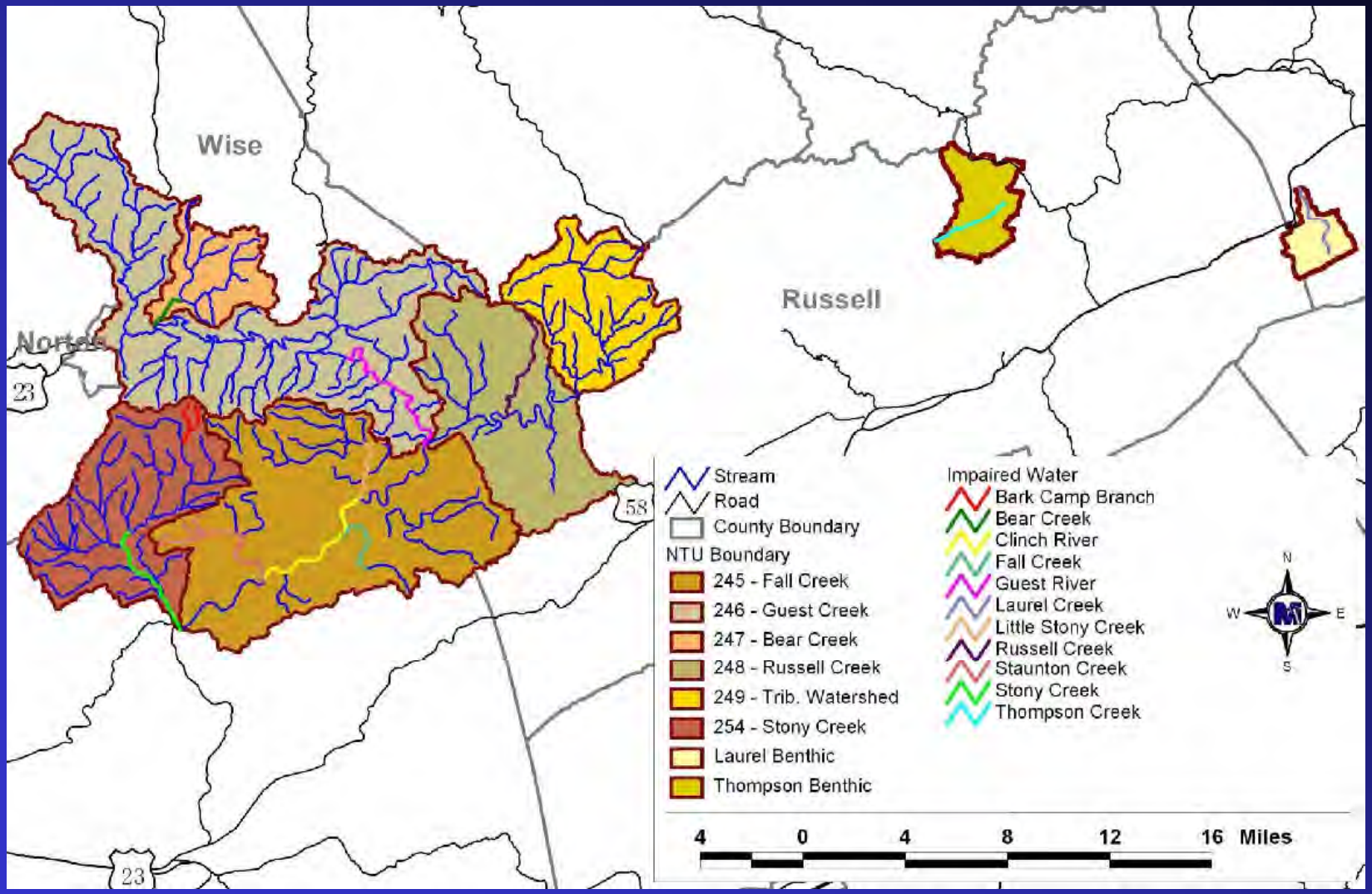
Impaired Streams in the Lower Clinch/Cove Creek Area

Stream Name Impairment ID	**Impairments Contracted**	**Initial Listing Year**	**2012 River Miles**	**2012 Listing Violation%**	**Impairment Location Description**
Clinch River VAS-P13R_CLN01A02	*E. coli*	2008	9.69	10.53 EC	From the Copper Creek confluence near Speers Ferry downstream to the Tennessee state line near Shelby.
Blackwater Creek VAS-P16R_BKW01A02	*E. coli*	2008	2.11	66 EC	From East Fork Blackwater Creek confluence downstream to the Tennessee state line.
Cove Creek VAS-P13R_COV01B08	E. coli	2008	6.94	44 EC	From its confluence with Millstone Branch to confluence with Clinch River north of Starnes Slant.
Stock Creek VAS-P13R_STO01A00	*E. coli*	2008	4.51	44 EC	From stream mile 4.56 downstream to the Clinch River confluence at Clinchport.
Copper Creek VAS-P14R_COP02B08	*E. coli*	2008	9.70	55 EC	From the Grassy Creek confluence upstream to beginning of WQS Class V waters.
Copper Creek VAS-P14R_COP03A02	*E. coli*	2008	4.3	44 EC	From mile 52.5 through Dickensonville upstream to mile 56.8.
Moll Creek VAS-P14R_MOL01A08	*E. coli*	2008	4.20	55 EC	From Copper Creek upstream, to second tributary, includes Porter Hollow.
Valley Creek VAS-P14R_VAL01A02	*E. coli*	2008	1.01	22 EC	From near Farley Chapel to confluence with Copper Creek.
North Fork Clinch River VAS-P15R_NFC01B00	*E. coli*	2008	7.62	55 EC	From the Pattonsville Branch confluence downstream to the Cox Branch confluence.
North Fork Clinch River VAS-P15R_NFC01B08	*E. coli*	2008	3.39	33 EC	From Fraley Branch confluence downstream to the Pattonsville Branch confluence.
North Fork Clinch River VAS-P15R_NFC01C02	*E. coli*	2010	5.59	44 EC	From the Cox Branch confluence near Fairview downstream to Tennessee state line near Dona.

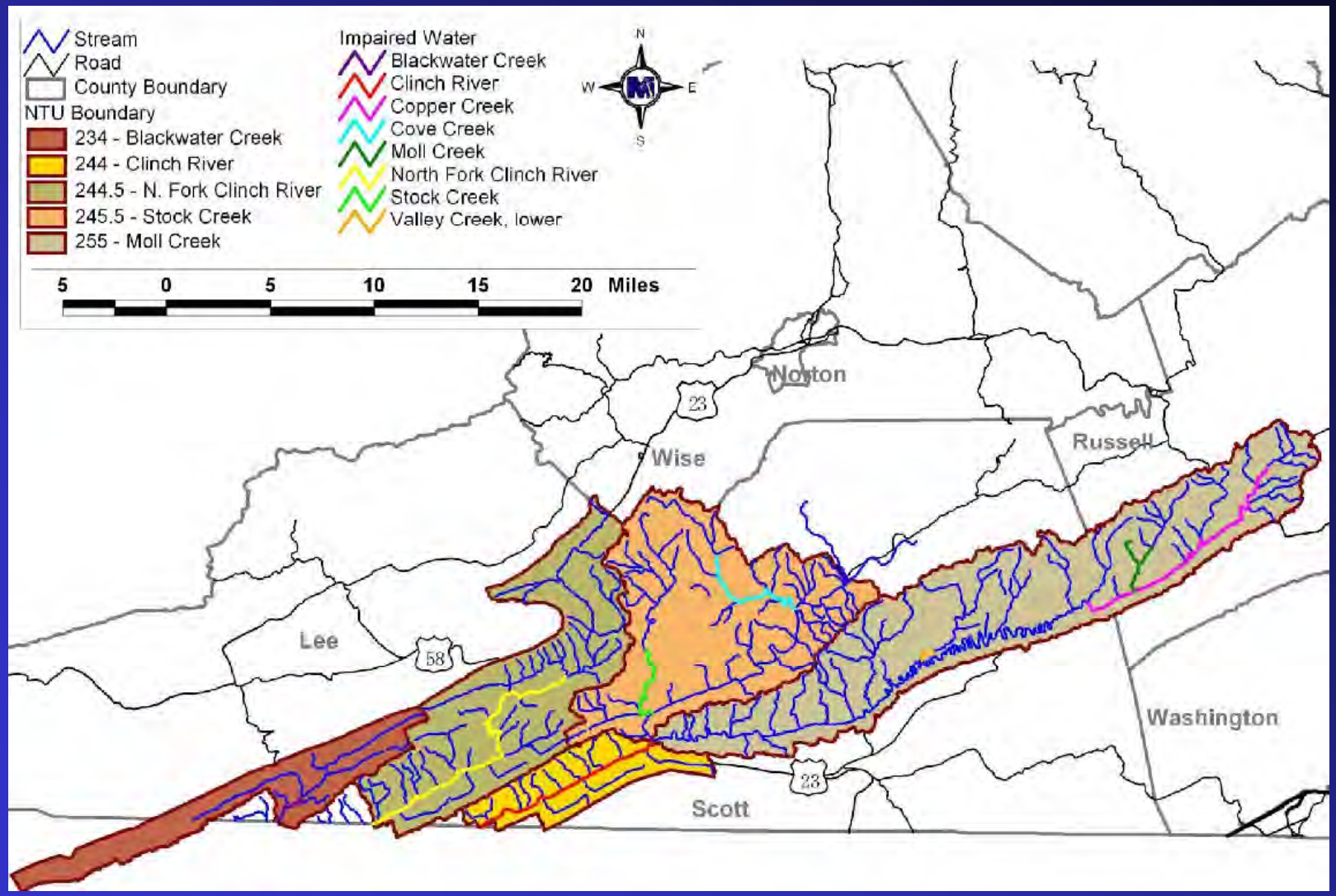
Location Map



Map of Impairments
Lower Clinch River Watershed



Map of Impairments
Lower Clinch/Cove Creek Area



E. Coli Bacteria Data in the Lower Clinch River Watershed

Stream	Station	Date	Count	Minimum	Maximum	Mean	Median	Standard Deviation	Violation[1] %
Bear Creek	6BBER001.14	2/05 - 12/11	25	25	1,600	312	100	439	32.0%
Guest River	6BGUE006.50	2/05 – 10/10	26	25	2,000	159	38	392	19.2%
Clinch River	6BCLN237.09	2/09 - 12/11	23	25	950	128	25	220	17.4%
Clinch River	6BCLN264.27	2/09 - 6/12	21	25	1,250	185	50	302	19.0%
Fall Creek	6BFLC000.52	2/05 - 12/11	26	25	2,000	281	98	445	34.6%
Little Stony Creek	6BLSR000.33	2/05 - 12/11	26	25	1,100	77	25	211	3.8%
Russelll Creek	6BRUS001.25	2/05 - 12/11	26	25	1,100	145	25	247	19.2%
Staunton Creek	6BSUT001.71	2/05 - 12/11	26	25	750	141	50	218	10.0%
Stony Creek	6BSNY001.98	7/05 - 12/11	20	25	320	78	38	88	11.5%

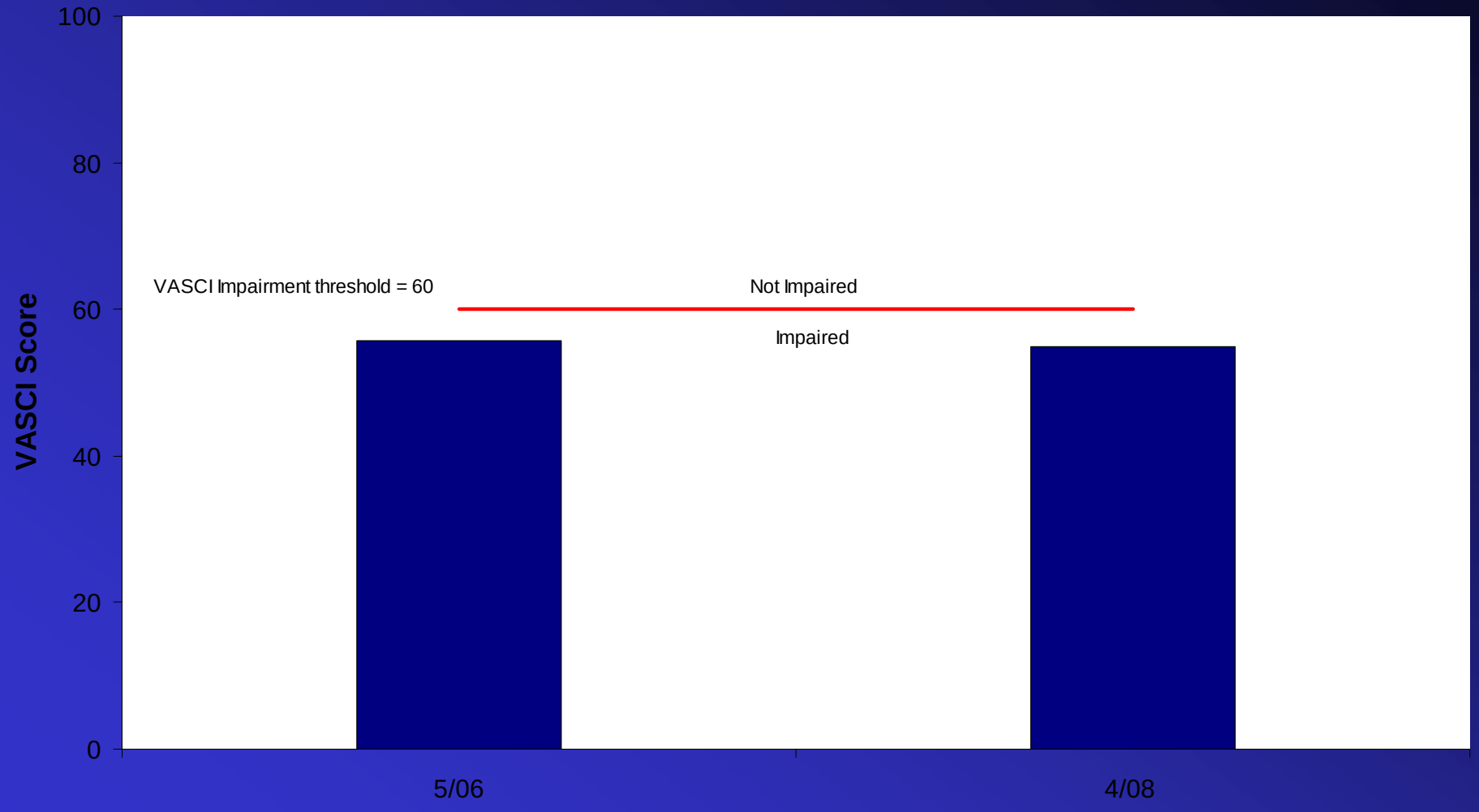
E. Coli Bacteria Data in the Lower Clinch/Cove Creek Area (Page 1of 2)

Stream	Station	Date	Count	Minimum	Maximum	Mean	Median	Standard Deviation	Violation[1] %
East Fork Blackwater Creek	6BBCE001.05	1/11 - 9/12	11	25	1,775	284	50	560.94	18.2%
Blackwater Creek	6BBKW005.82	7/05 - 9/12	20	50	2,000	463	263	502.63	55.0%
Clinch River	6BCLN202.07	1/11 - 9/12	11	25	1,125	245	50	369.60	27.3%
Clinch River	6BCLN206.70	1/05 - 9/12	45	25	2,000	169	25	408.85	11.1%
Clinch River	6BCLN207.95	3/08	1	10	10	10	NA	NA	0.0%
Clinch River	6BCLN213.02	1/11 - 9/12	11	25	1,100	261	50	374.39	27.3%
Clinch River	6BCLN225.94	10/12	1	110	110	110	NA	NA	0.0%
Copper Creek	6BCOP002.00	8/05 - 8/12	19	25	250	68	50	54.90	5.3%
Copper Creek	6BCOP012.73	8/05 - 8/12	19	25	200	72	50	60.03	0.0%
Copper Creek	6BCOP023.91	8/05 - 8/12	18	25	320	114	100	87.18	11.1%
Copper Creek	6BCOP032.73	8/05 - 8/12	18	25	525	155	135	135.02	16.7%
Copper Creek	6BCOP047.75	8/05 - 8/12	17	25	550	194	200	150.48	41.2%
Copper Creek	6BCOP052.77	8/05 - 8/12	18	25	2,000	369	213	454.34	44.4%
Cove Creek	6BCOV001.68	8/05 - 9/12	20	25	2,000	257	88	455.05	35.0%
Cove Creek	6BCOV004.26	1/11 - 9/12	8	25	1,100	209	75	367.41	25.0%

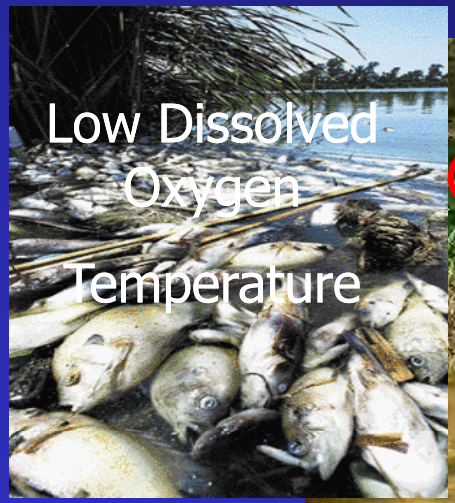
E. Coli Bacteria Data in the Lower Clinch/Cove Creek Area (Page 2 of 2)

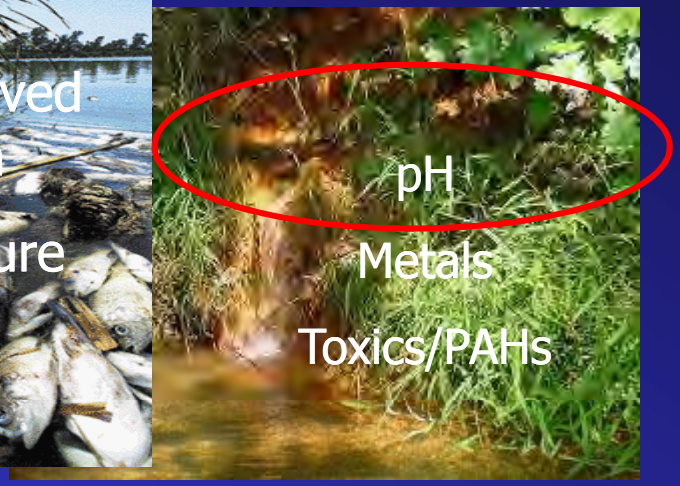
Stream	Station	Date	Count	Minimum	Maximum	Mean	Median	Stnd. Dev.	Violation %
Drakes Branch	6BDAK001.71	1/11 - 9/12	11	25	825	223	100	290.36	27.3%
Dry Branch	6BDRA001.07	3/05	1	10	10	10	NA	NA	0.0%
Moll Branch	6BMOL000.03	8/05 - 9/12	18	25	2,000	666	475	647.71	61.1%
Moll Branch	6BMOL001.75	5/11	1	190	190	190	NA	NA	0.0%
Moll Branch	6BMOL003.98	2/11 - 8/12	9	125	1,750	739	550	545.31	77.8%
North Fork Clinch River	6BNFC003.80	7/05 - 9/12	20	25	2,000	396	135	584.28	45.0%
North Fork Clinch River	6BNFC010.65	7/05 - 9/12	20	25	2,000	364	213	578.19	50.0%
North Fork Clinch River	6BNFC018.68	7/05 - 9/12	20	25	2,000	392	150	585.80	35.0%
Obeys Creek	6BOBE000.07	8/05 - 12/06	9	25	300	61	25	91.10	11.1%
Peters Branch	6BPTR000.02	2/11 - 8/12	9	25	1,100	286	175	340.52	33.3%
Richmond Branch	6BRIC001.80	1/11 - 9/12	4	25	2,000	563	113	961.88	25.0%
Stock Creek	6BSTO000.45	7/05 - 9/12	20	25	2,000	427	175	689.98	40.0%
Stock Creek	6BSTO004.56	7/05 - 9/12	31	25	2,000	183	25	422.13	12.9%
Valley Creek	6BVAL000.25	8/05 - 8/12	18	25	500	218	180	179.60	38.9%
Valley Creek	6BVAL004.08	2/11 - 8/12	9	25	275	94	75	83.65	11.1%
Copper Creek X-Trib	6BXGD000.01	4/09	1	110	110	110	NA	NA	0.0%

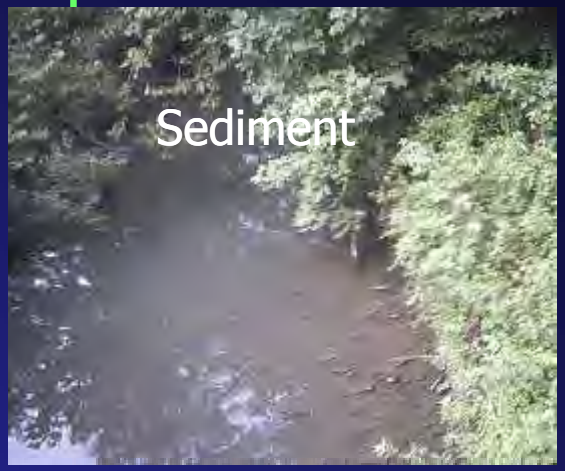
What Are Biological Monitoring Scores in Bark Camp Branch?

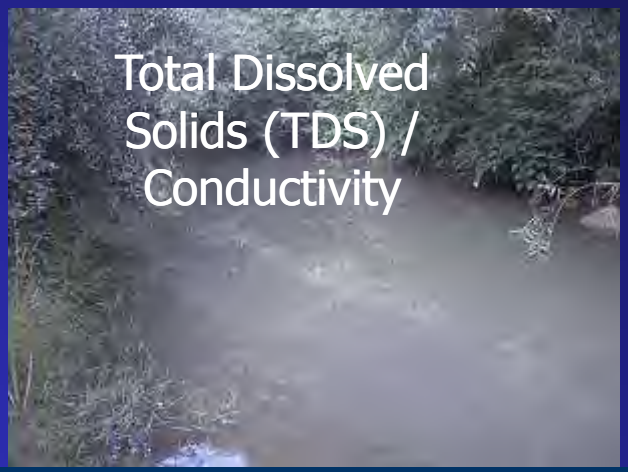


Bark Camp Branch: What is harming the Aquatic Life?

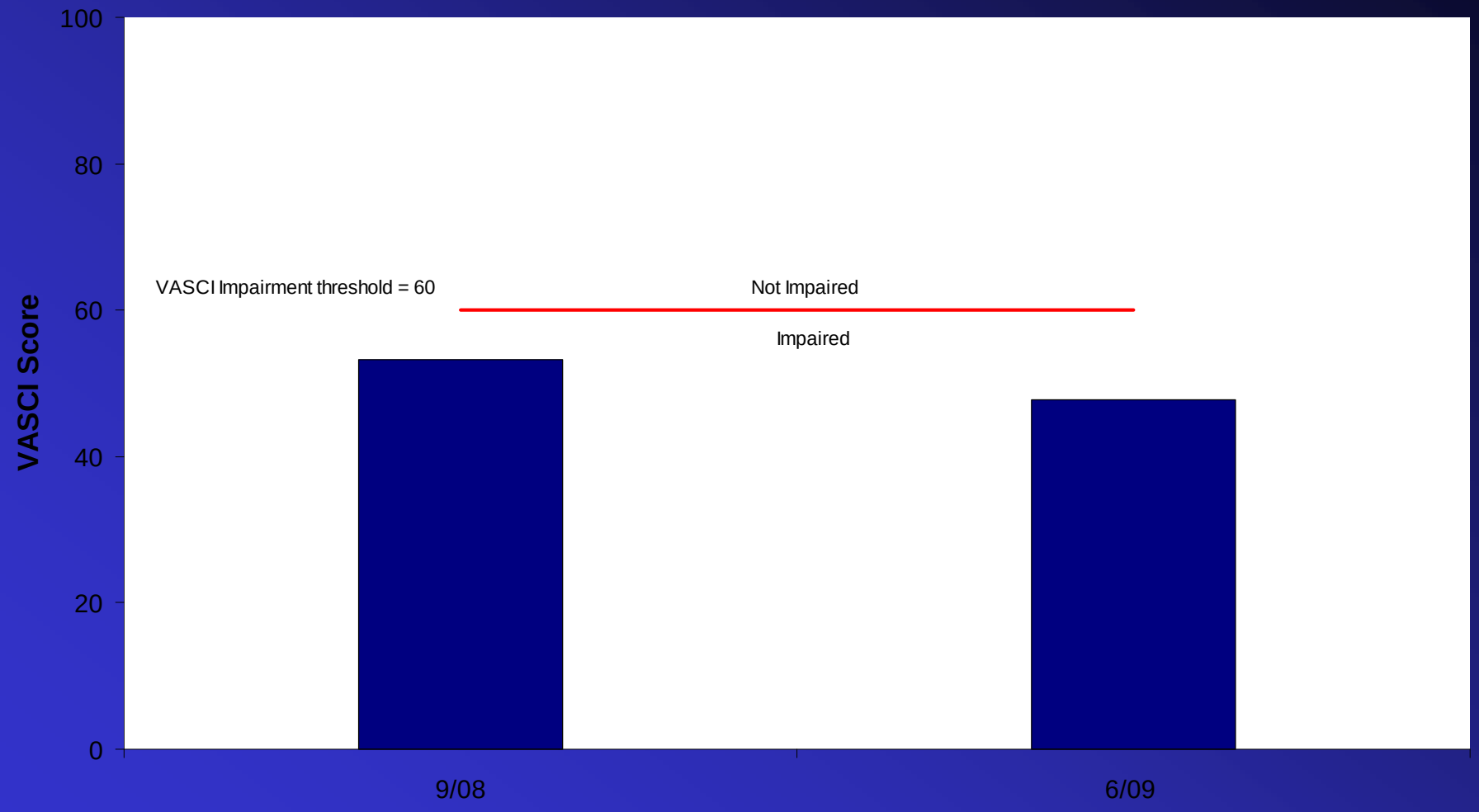




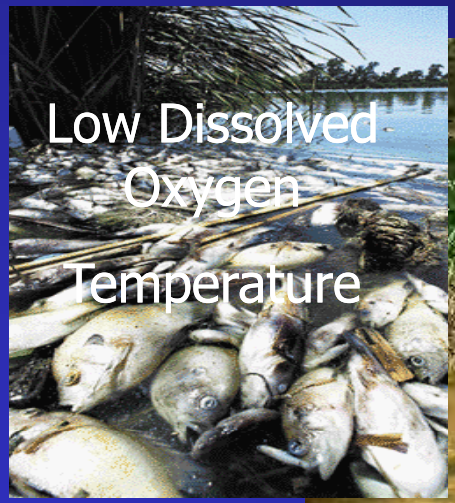


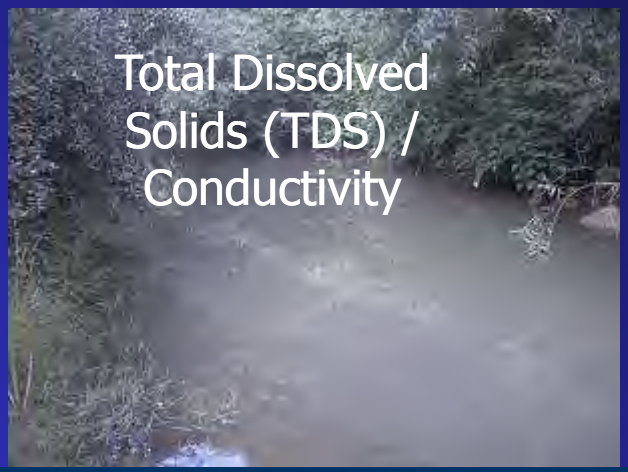


What Are Biological Monitoring Scores in Laurel Creek?

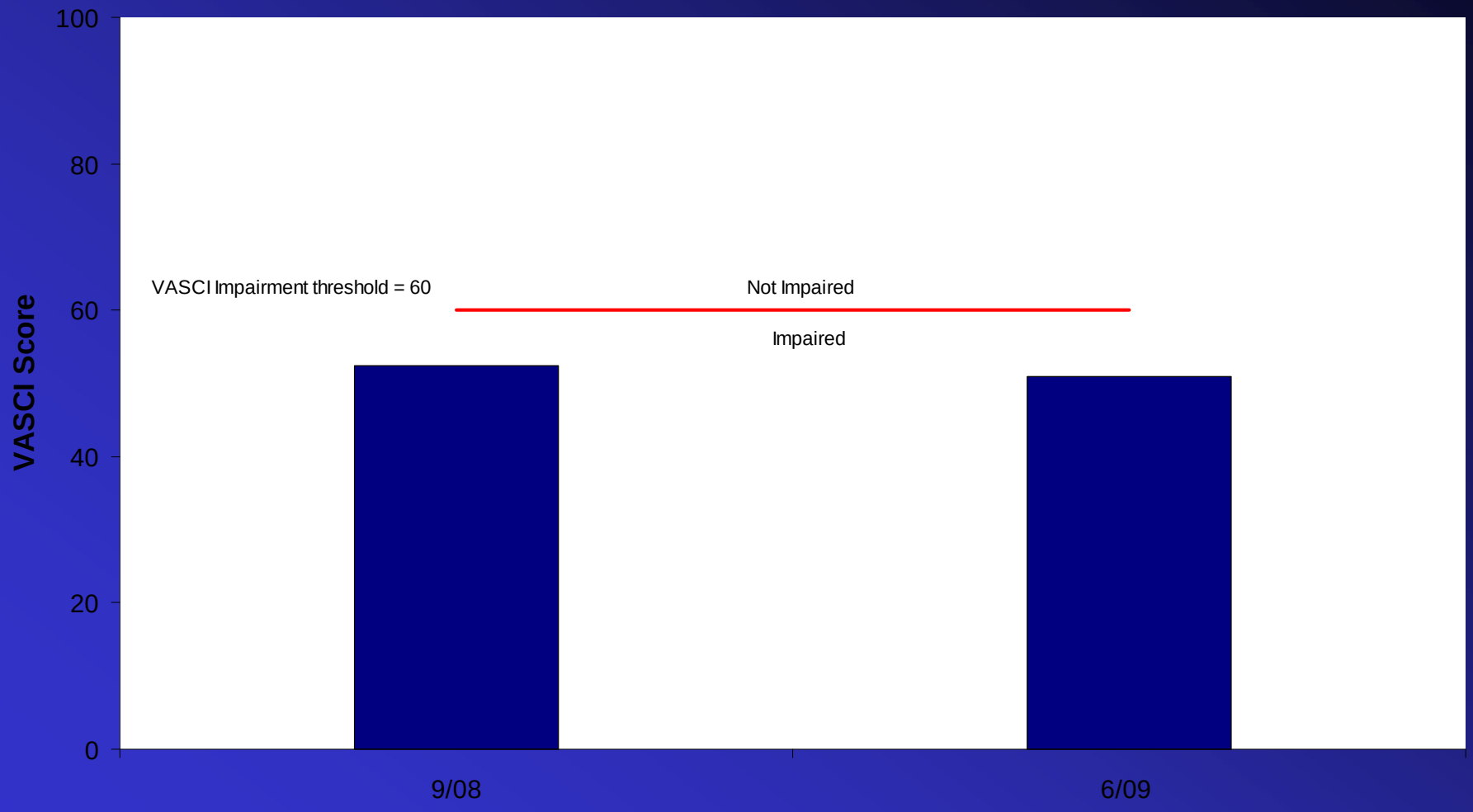


Laurel Creek: What is harming the Aquatic Life?

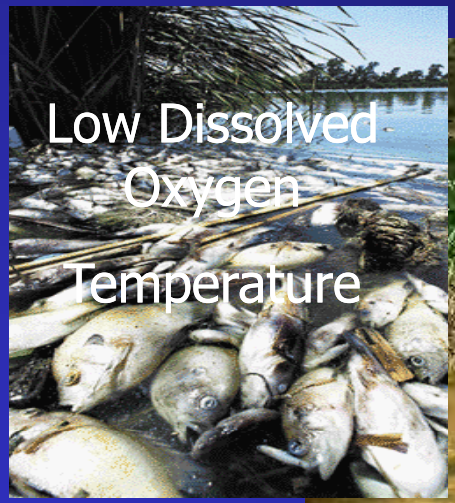


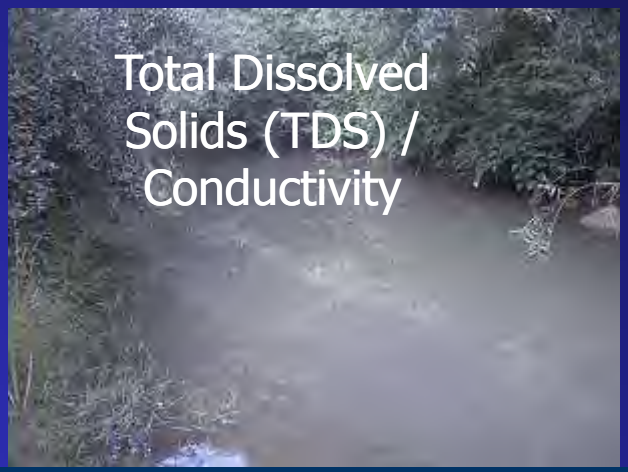


What Are Biological Monitoring Scores in Thompson Creek?



Thompson Creek: What is harming the Aquatic Life?



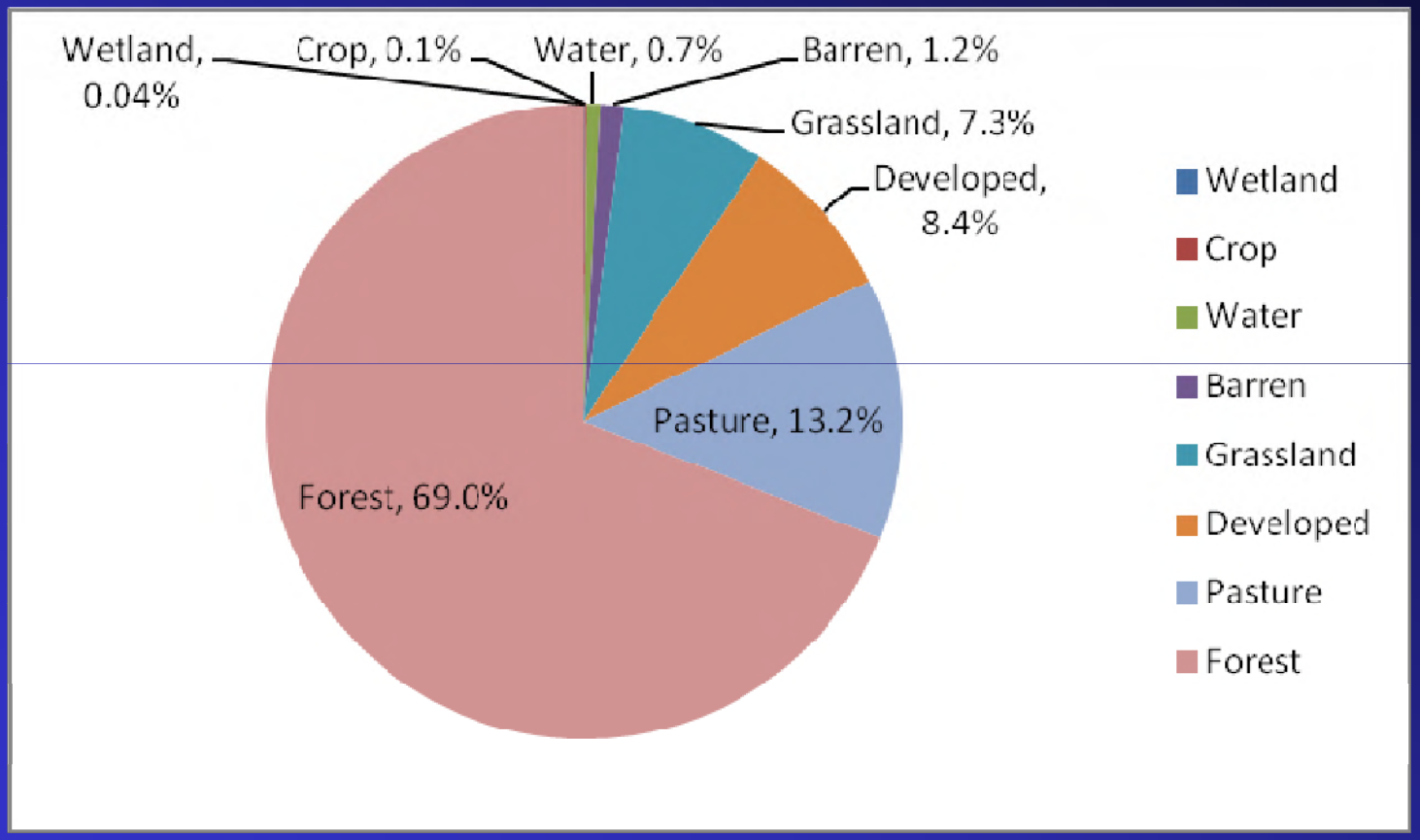


Major components of a TMDL

- Monitoring/Listing - Identify Water Quality Problem
  - Monitoring Ongoing
  - Listing Completed by DEQ
- Source Assessment – Locate Potential Sources of Pollutants in Watershed
  - Estimates presented in this presentation– 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

for the combined project areas



Source Assessment

- Permitted discharges
  - Wastewater treatment facilities
  - Residential Waste Treatment Systems
- Human
  - Biosolids Applications
  - Failing Septic Systems
  - Straight Pipes
- Pets
- Livestock
- Wildlife

Permits - Lower Clinch River Watershed

- Permitted direct discharges of water and bacteria in the Lower Clinch River Watershed

Permit	Receiving Stream(s)	Facility Name	Permitted for *E. coli* Control
VA0023027	Corder Branch of Little Stony Creek	USDA -Forest Service- Jefferson National Forest - Flatwoods	Y
VA0061743	Corder and Ramey Branch confluence	Sheffield Acres STP	Y
VA0070670	Clinch River	Dungannon STP	Y
VA0026221	Clinch River	St Paul Aerated Lagoon	Y
VA0023477	U.T. to Bad Branch of Guest River	DOC-Wise Co. Correctional Unit #18 STP	Y
VA0077828	Guest River	Coeburn-Norton-Wise Regional WWTP	Y
VA0092045	Guest River	Robinette Moble Home Park WWTP	Y
VAG400*		84 Domestic Permits	Y

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

Permits - Clinch River/Cove Creek Area

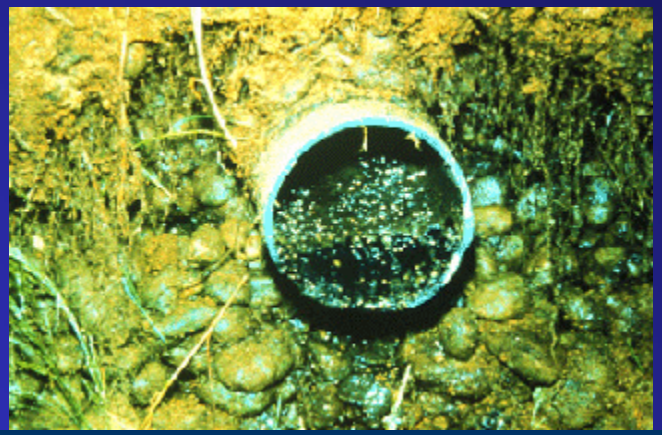
- Permitted direct discharges of water and bacteria in the Lower Clinch River/Cove Creek Area

Permit	Receiving Stream	Facility Name	Permitted for *E. coli* Control
VA0066311	Culbertson Branch	Scott County Schools - Twin Springs High	Y
VA0087955	Copper Creek	Nickelsville WWTP	Y
VA0029564	North Fork Clinch River	Duffield Industrial Park WWTP	Y
VA0065471	North Fork Clinch River X-Trib	Empire Mobile Home Park STP	Y
VA0064009	North Fork Clinch River	Beeline Mobile Home Park STP	Y
VAG400*		35 Domestic Permits	Y

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

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
- Biosolids
  - Land-applied



Human Population in the Lower Clinch River Watershed

NTU	NTU Name	Human Population	Housing Units	Homes with Sewer	Homes with Septic	Estimated Homes with Straight Pipes	Homes with Failing Septic Systems
245	Fall Creek	2,239	1,175	169	899	107	30
246	Guest Creek	12,526	5,858	3,031	2,643	185	88
247	Bear Creek	6,775	2,860	1,663	1,129	68	38
248	Russell Creek	3,483	1,674	358	1,200	115	40
249	Trib. Watershed	1,736	908	0	631	277	21
254	Stony Creek	349	303	14	245	45	8
Total		**27,108**	**12,779**	**5,235**	**6,747**	**796**	**225**

Human Population in the Lower Clinch/Cove Creek Area

NTU	NTU Name	Human Population	Housing Units	Homes with Sewer	Homes with Septic	Estimated Homes with Straight Pipes	Homes with Failing Septic Systems
234	Blackwater Creek	431	252	0	202	50	7
244	Clinch River	581	343	0	305	38	10
244.5	N. Fork Clinch River	3,721	1,706	108	1,443	155	48
245.5	Stock Creek	2,481	1,360	7	1,167	187	39
255	Moll Creek	5,680	2,858	22	2,601	235	87
Total		**12,894**	**6,520**	**137**	**5,719**	**664**	**191**

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 Lower Clinch River Watershed

NTU	NTU Name	Dogs	Cats
245	Fall Creek	547	612
246	Guest Creek	2,850	3,192
247	Bear Creek	1,424	1,595
248	Russell Creek	817	915
254	Stony Creek	134	151
249	Trib. Watershed	417	467
Total		**6,189**	**6,931**

Pet Population in the Lower Clinch/Cove Creek Area

NTU	NTU Name	Dogs	Cats
234	Blackwater Creek	111	124
244	Clinch River	160	179
244.5	N. Fork Clinch River	816	913
245.5	Stock Creek	631	707
255	Moll Creek	1,362	1,526
Total		**3,080**	**3,449**

Livestock Population

- Population based on amount of pasture in watershed and populations from Virginia 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 Lower Clinch River Watershed

NTU	NTU Name	Beef	Dairy	Horse	Sheep	Hog
245	Fall Creek	1,651	0	212	277	13
246	Guest Creek	38	0	98	38	0
247	Bear Creek	0	0	37	12	0
248	Russell Creek	1,001	0	98	77	4
249	Trib. Watershed	278	0	27	25	1
254	Stony Creek	237	0	34	44	2
	Total	**3,206**	**0**	**506**	**473**	**20**

Livestock Population in the Lower Clinch/Cove Creek Area

NTU	NTU Name	Beef	Dairy	Horse	Sheep	Hog
234	Blackwater Creek	918	0	88	46	4
244	Clinch River	794	0	105	143	7
244.5	N. Fork Clinch River	644	0	83	108	5
245.5	Stock Creek	3,435	0	455	617	28
255	Moll Creek	10,201	550	1,180	1,419	66
	Total	**15,993**	**550**	**1,911**	**2,333**	**110**

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 Lower Clinch River Watershed

NTU	NTU Name	Deer	Turkey	Beaver	Raccoon	Muskrat	Duck	Goose
245	Fall Creek	1,771	445	845	3,624	4,146	86	42
246	Guest Creek	1,837	425	427	3,890	2,152	45	22
247	Bear Creek	293	55	62	612	335	7	3
248	Russell Creek	935	227	256	1,920	1,324	28	14
249	Trib. Watershed	598	141	160	1,227	771	16	8
254	Stony Creek	917	234	492	1,875	2,363	49	24
	Total	**6,351**	**1,527**	**2,243**	**13,148**	**11,092**	**231**	**113**

Wildlife Population in the Lower Clinch/Cove Creek Area

NTU	NTU Name	Deer	Turkey	Beaver	Raccoon	Muskrat	Duck	Goose
234	Blackwater Creek	757	191	340	1,550	1,636	34	17
244	Clinch River	540	134	382	1,106	1,852	39	19
244.5	N. Fork Clinch River	1,786	437	876	3,665	4,248	89	43
245.5	Stock Creek	2,077	525	1,237	4,250	6,003	125	61
255	Moll Creek	2,930	732	1,895	6,000	9,088	189	93
	Total	**8,089**	**2,019**	**4,731**	**16,570**	**22,828**	**476**	**234**

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
  - Join a Local Watershed Group – Volunteer!
  - Plant Native Trees and Shrubs in the Riparian Corridor
  - Perform Citizen monitoring

What's Next?

- Modeling for TMDL Allocation
- Final Public Meeting
  - 30 day comment period
- TMDL submitted to EPA then SWCB
- On list for Implementation Plan development

Send Comments To:

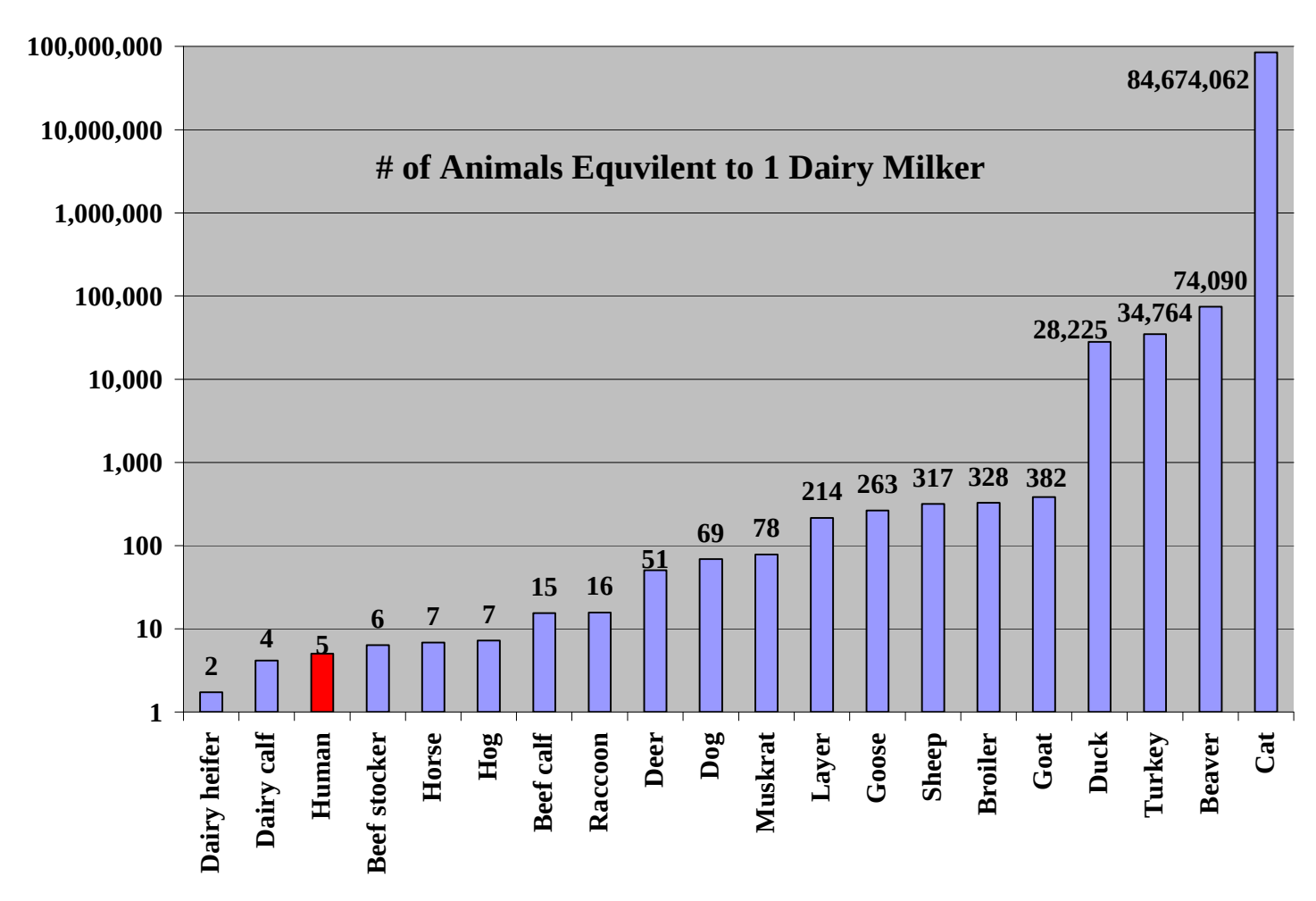
Martha Chapman

TMDL Projects Coordinator

Department of Environmental Quality

Martha.Chapman@deq.virginia.gov

Phone: (276) 676-4845

Fax: (276) 676-4899

Fecal Bacteria Production Comparison