



# **1<sup>st</sup> Community Engagement Meeting for the development of a Clean Up Plan (Implementation Plan) for the Pigg River, Poplar Branch, Fryingpan Creek, and Beaverdam Creek Watersheds**

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# What do we hope to accomplish today?

- Remind ourselves of Virginia's water quality process
- Review the TMDLs that guide this Implementation Plan
- Discuss how to reduce sediment and bacteria in the watershed
  - Prioritizing BMPs for inclusion in the implementation plan
- Next steps

# Virginia's Water Quality Process



# Reviewing the TMDLs

## 2006 Bacteria TMDL

### Bacteria TMDL for Beaverdam Creek Bedford County, Virginia

Submitted by  
Virginia Department of Environmental Quality  
April, 2006

## 2022 Benthic TMDL

### Benthic TMDL Development for the Beaverdam Creek, Fryingpan Creek, Pigg River, and Poplar Branch Watersheds Located in Bedford, Pittsylvania, and Franklin Counties



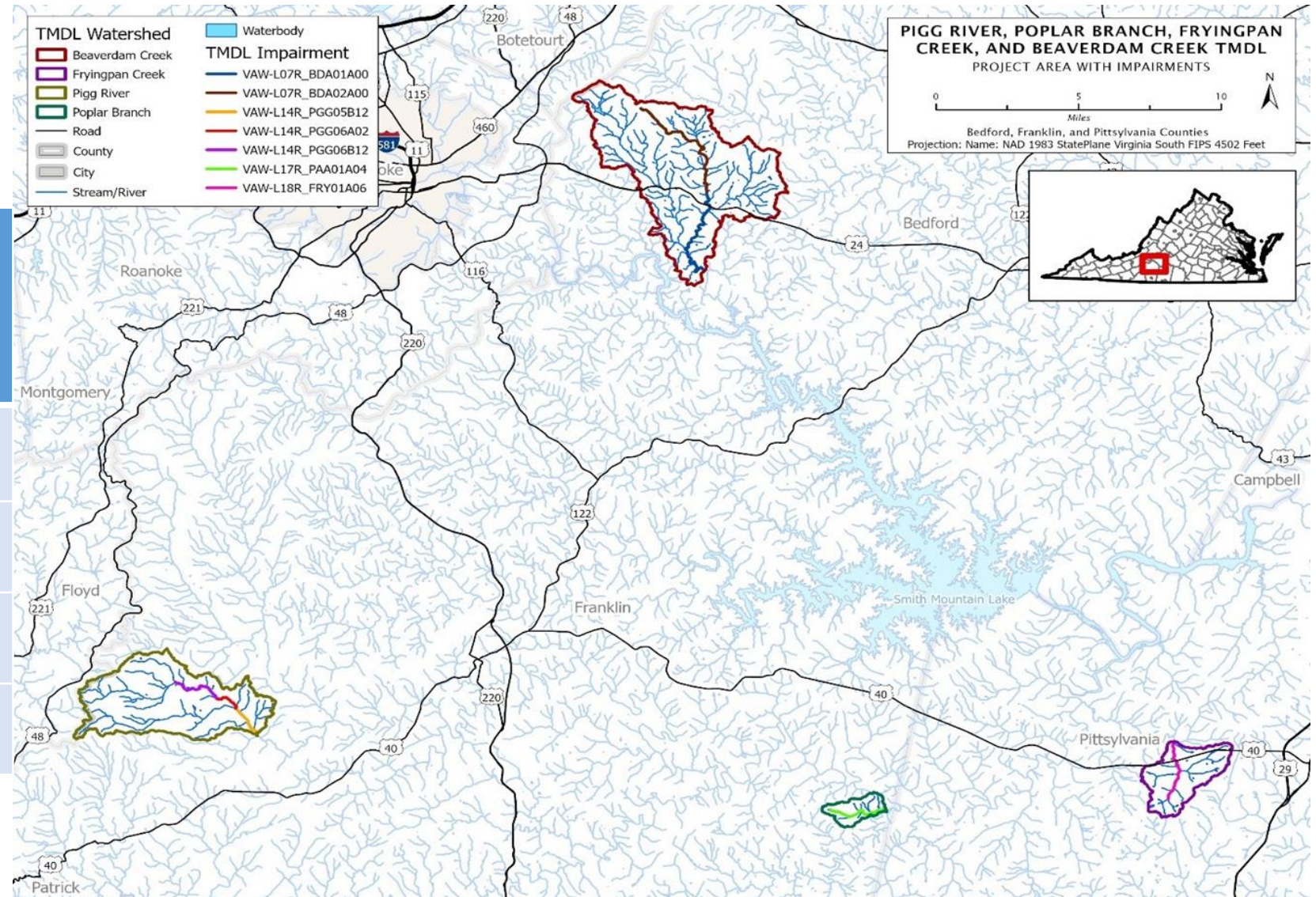
Prepared by:  
Wetland Studies and Solutions, Inc.  
and  
James Madison University

Prepared for:  
Virginia Department of Environmental Quality  
October 2022





# Impaired Stream Segments



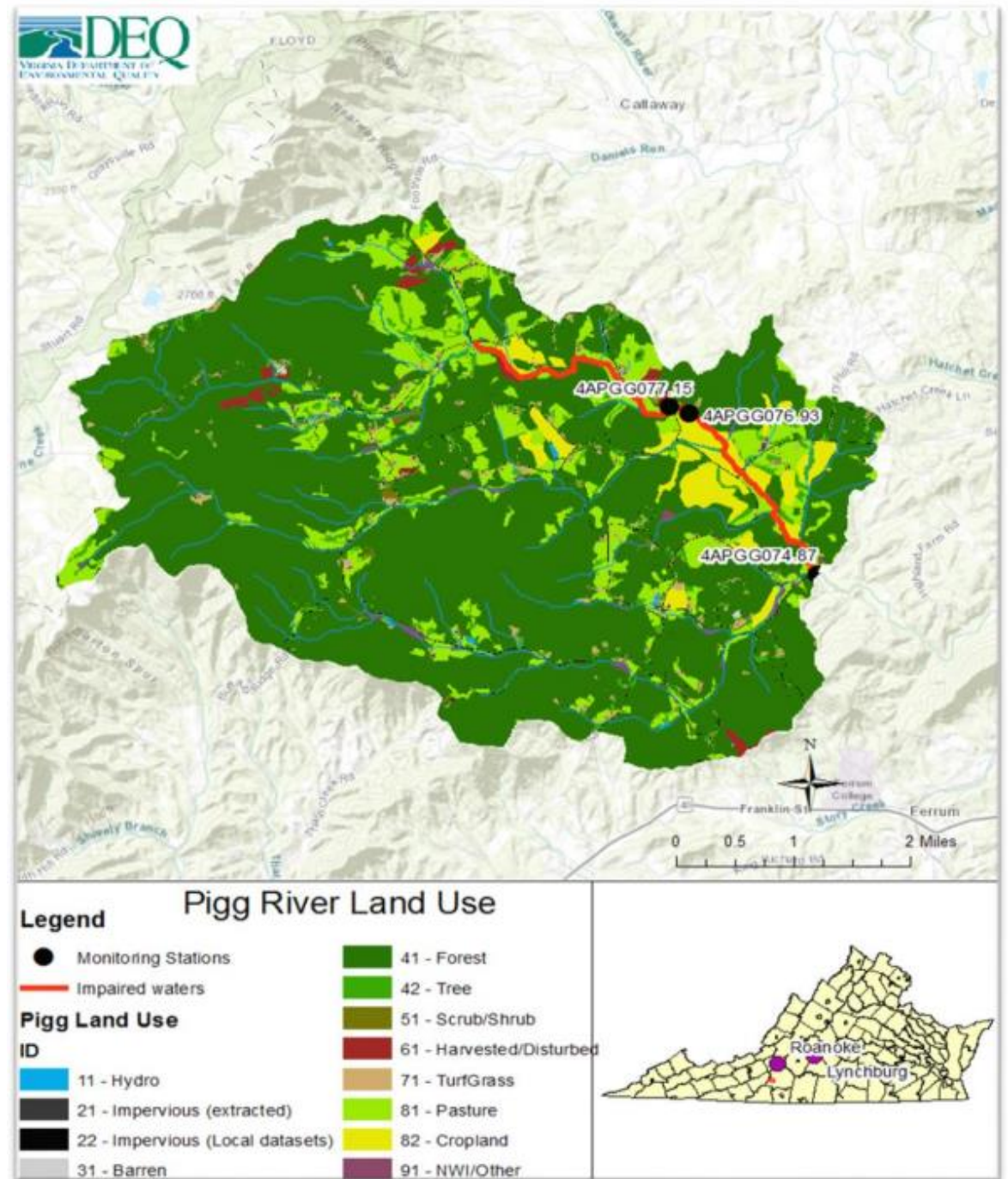
Impaired Streams	Initial Listing Year (Benthic)	Initial Listing Year (Bacteria)
Beaverdam Creek*	2010	2006
Fryingpan Creek	2006	
Pigg River	2012	
Poplar Branch	2008	

\*- TMDLs developed for both Sediment and Bacteria



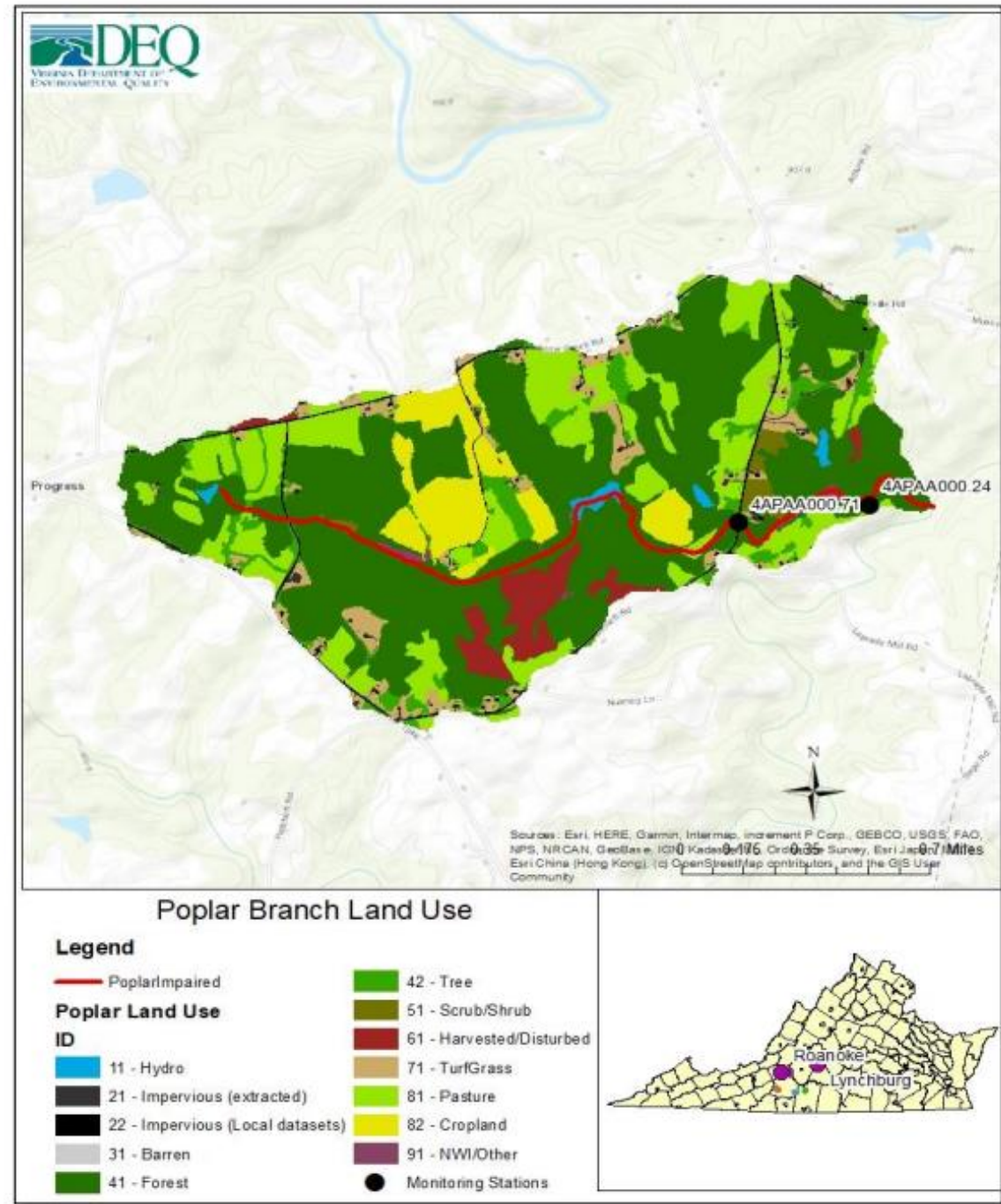
# From the 2022 TMDL study: Pigg River Land Use

Land use type	Land use description	Pigg River	
		Area (acres)	Percent land use
Water	Drainage networks and basins	14.61	0.10%
Impervious	Extracted and External- high percentage of constructed materials	193.46	1.34%
Barren	Areas with little or no vegetation	6.62	0.05%
Forest	Areas with tree cover of natural or semi-natural woody vegetation	10745.34	74.55%
Tree	Areas with tree cover of natural or semi-natural woody vegetation that does not encompass an acre	605.23	4.20%
Turf Grass	Primarily grasses	281.57	1.95%
Harvested/Disturbed	Areas of forest clear-cut, temporary clearing of vegetation, and other dynamically changing land cover due to land use activities as defined by the EPA	123.55	0.86%
Shrub	Areas of natural or semi-natural woody vegetation with aerial stems generally less than 6 meters	30.06	0.21%
Pasture	Areas of grasses, legumes, or grass-legumes planted for livestock grazing	1781.10	12.36%
Cropland	Areas of herbaceous vegetation that has been planted for production of food	554.59	3.85%
NWI/Other	Soil or substrate periodically covered with water	77.72	0.54%



# From the 2022 TMDL study: Poplar Branch Land Use

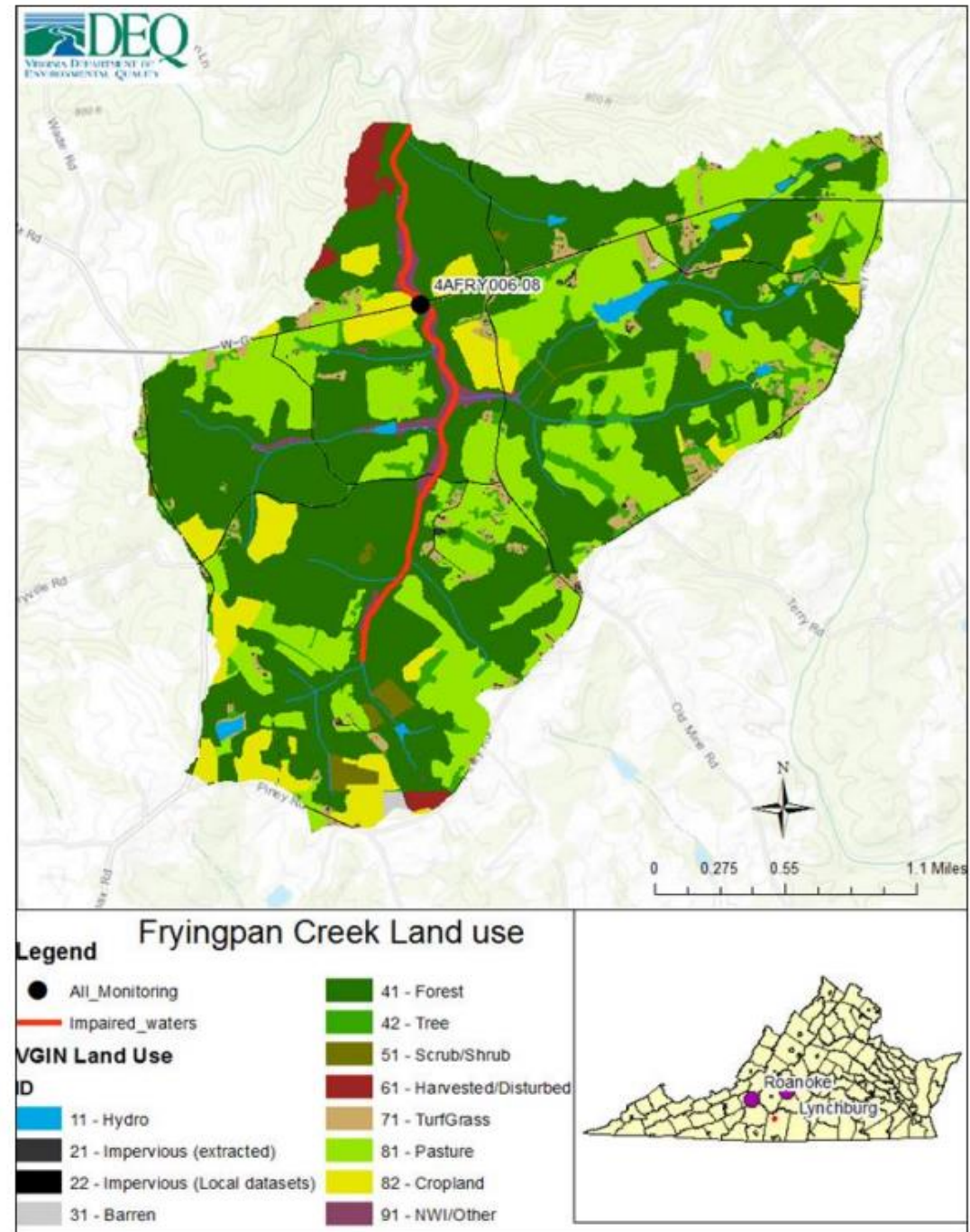
Land use type	Land use description	Poplar Branch	
		Area (acres)	Percent land use
Water	Drainage networks and basins	8.88	0.83%
Impervious	Extracted and External- high percentage of constructed materials	27.27	2.56%
Barren	Areas with little or no vegetation	0	0
Forest	Areas with tree cover of natural or semi-natural woody vegetation	565.57	52.96%
Tree	Areas with tree cover of natural or semi-natural woody vegetation that does not encompass an acre	65.96	6.18%
Turf Grass	Primarily grasses	53.88	5.04%
Harvested/Disturbed	Areas of forest clear-cut, temporary clearing of vegetation, and other dynamically changing land cover due to land use activities as defined by the EPA	43.51	4.07%
Shrub	Areas of natural or semi-natural woody vegetation with aerial stems generally less than 6 meters	11.80	1.11%
Pasture	Areas of grasses, legumes, or grass-legumes planted for livestock grazing	204.36	19.14%
Cropland	Areas of herbaceous vegetation that has been planted for production of food	80.43	7.53%
NWI/Other	Soil or substrate periodically covered with water	6.34	0.59%





# From the 2022 TMDL study: Fryingpan Creek Land Use

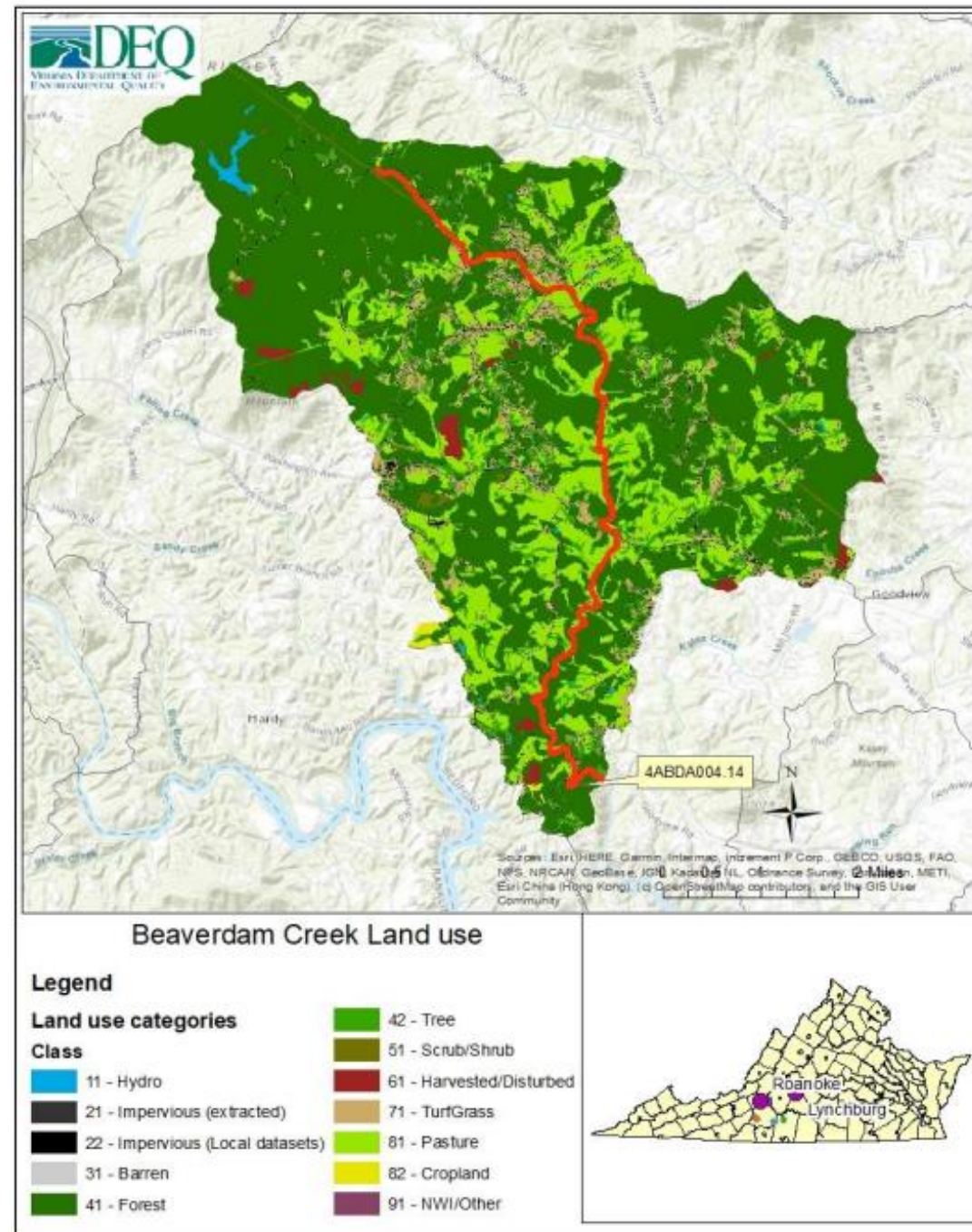
		Fryingpan Creek	
Land use type	Land use description	Area (acres)	Percent land use
Water	Drainage networks and basins	30.61	0.89%
Impervious	Extracted and External- high percentage of constructed materials	51	1.48%
Barren	Areas with little or no vegetation	5.43	0.16%
Forest	Areas with tree cover of natural or semi-natural woody vegetation	1780.69	51.70%
Tree	Areas with tree cover of natural or semi-natural woody vegetation that does not encompass an acre	170.60	4.95%
Turf Grass	Primarily grasses	121.01	3.51%
Harvested/Disturbed	Areas of forest clear-cut, temporary clearing of vegetation, and other dynamically changing land cover due to land use activities as defined by the EPA	42.43	1.23%
Shrub	Areas of natural or semi-natural woody vegetation with aerial stems generally less than 6 meters	32.78	0.95%
Pasture	Areas of grasses, legumes, or grass-legumes planted for livestock grazing	911.01	26.45%
Cropland	Areas of herbaceous vegetation that has been planted for production of food	6.87	6.87%
NWI/Other	Soil or substrate periodically covered with water	62.21	1.81%



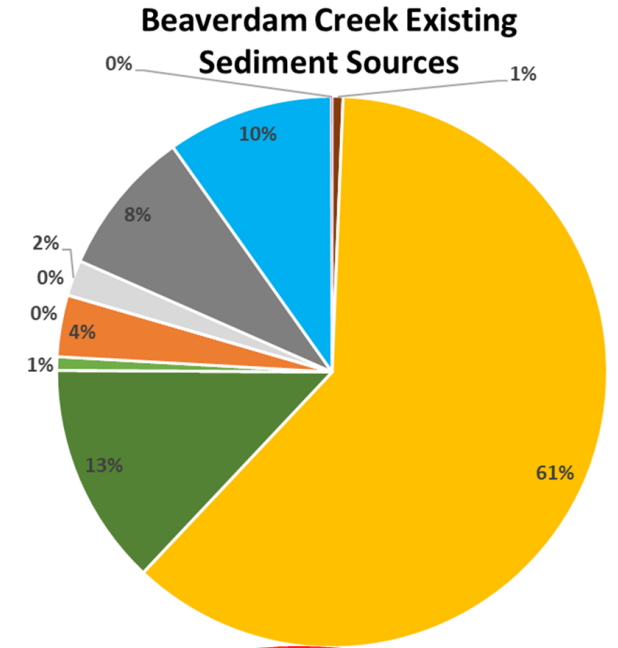
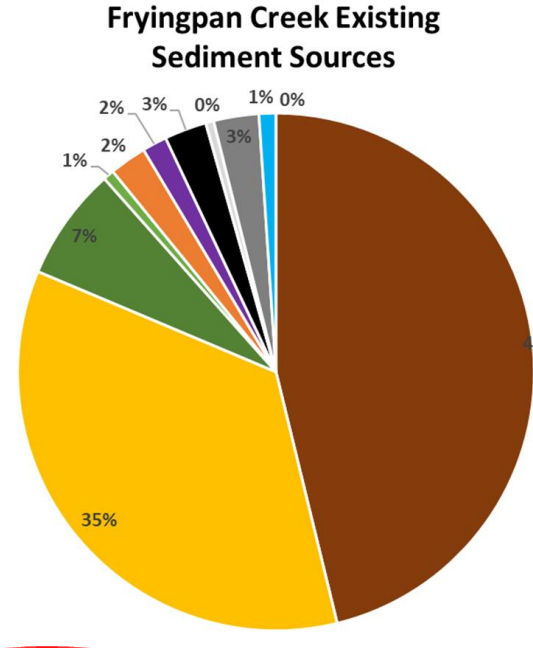
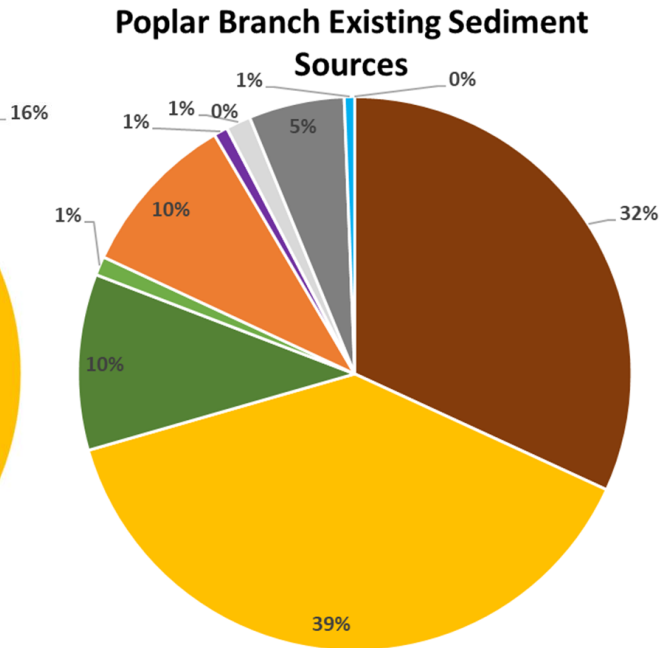
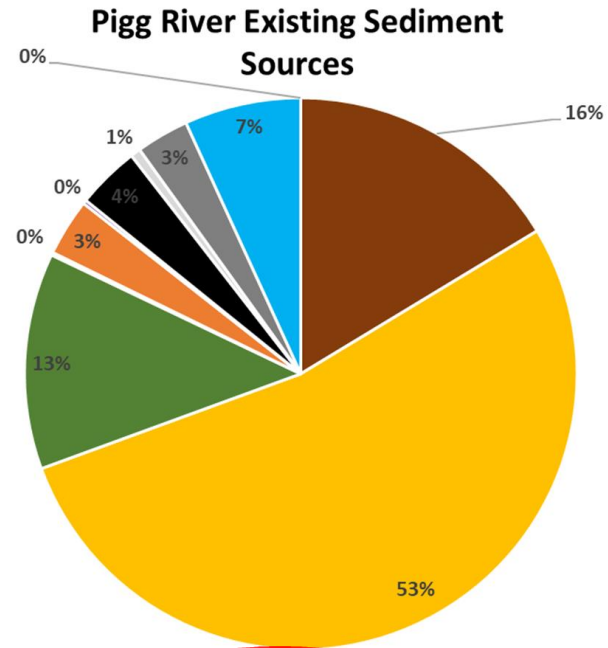


# From the 2022 TMDL study: Beaverdam Creek Land Use

		Beaverdam Creek	
Land use type	Land use description	Area (acres)	Percent land use
Water	Drainage networks and basins	74.75	0.43%
Impervious	Extracted and External- high percentage of constructed materials	473.22	2.74%
Barren	Areas with little or no vegetation	0	0
Forest	Areas with tree cover of natural or semi-natural woody vegetation	10443.56	60.39%
Tree	Areas with tree cover of natural or semi-natural woody vegetation that does not encompass an acre	1738.75	10.06%
Turf Grass	Primarily grasses	1033.96	5.98%
Harvested/Disturbed	Areas of forest clear-cut, temporary clearing of vegetation, and other dynamically changing land cover due to land use activities as defined by the EPA	191.96	1.11%
Shrub	Areas of natural or semi-natural woody vegetation with aerial stems generally less than 6 meters	89.98	0.52%
Pasture	Areas of grasses, legumes, or grass-legumes planted for livestock grazing	3193.11	18.47%
Cropland	Areas of herbaceous vegetation that has been planted for production of food	48.18	0.28%
NWI/Other	Soil or substrate periodically covered with water	4.70	0.03%



# From the 2022 TMDL study:



- Cropland
- Pasture/Hay
- Forest/Trees
- Shrub
- Harvested/Disturbed
- Wetland
- Barren
- Turfgrass
- Urban/Suburban
- Streambank
- Permitted

- Cropland
- Pasture/Hay
- Forest/Trees
- Shrub
- Harvested/Disturbed
- Wetland
- Barren
- Turfgrass
- Urban/Suburban
- Streambank
- Permitted

- Cropland
- Pasture/Hay
- Forest/Trees
- Shrub
- Harvested/Disturbed
- Wetland
- Barren
- Turfgrass
- Urban/Suburban
- Streambank
- Permitted

- Cropland
- Pasture/Hay
- Forest/Trees
- Shrub
- Harvested/Disturbed
- Wetland
- Barren
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- Urban/Suburban
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- Permitted

# From the 2022 TMDL study: Sediment Load Reductions

Watershed	Crop, Pasture, Hay (%)	Forest, Trees, Shrubs, Wetland (%)	Developed Pervious and Impervious Areas, Barren, Turfgrass (%)	Streambank Erosion (%)	Permitted Sources (%)
<b>Pigg River</b>	31.5%	0%	31.5%	31.5%	0%
<b>Poplar Branch</b>	56.1%	0%	56.1%	56.1%	0%
<b>Fryingpan Creek</b>	76.1%	0%	76.1%	76.1%	0%
<b>Beaverdam Creek</b>	30.4%	0%	30.4%	30.4%	0%



# From the 2006 TMDL study: **Bacteria Load Reductions**

Watershed	Percent (%) Reduction in Bacteria Loads Needed			
	Human Sources (failed septic systems and straight pipes)	Livestock (direct instream loading)	Agricultural and urban nonpoint sources	Wildlife (direct instream loading)
<b>Beaverdam Creek</b>	100	99	99	85.5

**Any Questions?**

**Now, what's happened  
since those TMDLs?**

# BMPs that reduce Sediment implemented since March 2021

Practice	Number	BMP Code	Amount	Units
Harvestable Cover Crop	2	SL-8H	308.9	Acres
Small Grain and Mixed Cover Crop	1	SL-8B	110.7	Acres
Stream Exclusion in Floodplain	1	SL-6F	3,208	Linear feet
Stream Exclusion with Wide Buffer	2	SL-6W	6,289	Linear feet



# BMPs that reduce Bacteria implemented since 2006

## Beaverdam Creek

BMP Name	Number	BMP Code	Amount	Units
Alternative Water System	3	SL-6B	139.0	Acres
CREP Linear Foot of Streambank Protected	1	CRLF-1	2,021	Linear feet
CREP Riparian Forest Buffer	4	CP-22	29.4	Acres
CREP Stream Exclusion with Grazing Land Management	2	CRSL-6	5,640	Linear feet
CREP Woodland Buffer Filter Area	4	CRFR-3	18.6	Acres
Livestock Exclusion with Reduced Setback	1	LE-2	2,175	Linear feet
Stream Exclusion with Grazing Land Management	7	SL-6	16,849	Linear feet

# Agriculture statistics: Change since Bacteria TMDL

USDA National Agricultural Statistics Service, NASS

Item	Bedford County		
	2002	2022	% change
Farm Acres	199,244	183,200	-8%
Cattle/Calves	46,693	38,626	-17%
Beef Cattle	23,500	20,984	-11%
Dairy Cattle	1,838	230	-87%
Sheep	343	507	48%
Horses	2,104	1,542	-27%

# What changes have you seen in the watersheds?

1. What is the current growth trend for agriculture in the area? Do you expect to see significant changes in farming practices over the next 5-10 years?
2. Is there a trend or has there been a change in crop practices? What % of cropland is already implementing conservation (e.g., continuous no-till) practices?



# Residential Overview

Within the Beaverdam Creek watershed, estimated totals (US Census 2020):

Estimated Population	Total Septic Systems	Houses with Failing Septic Systems	Houses with Straight Pipes	Pets	
				Dogs	Cats
		10% of households	0.5% of households	1.7 per household	2.1 per household
3,582	1,665	166	8	2,831	3,497

# What changes have you seen in the watersheds?

1. What is the current trend in housing? Are new homes being built, or is the housing stock aging?
2. Is there plan for future expansion of sewer coverage in the watershed?
3. Is there any information regarding straight pipes in the watershed?

# Prioritizing BMPs for this Implementation Plan

- Sediment
  - Agricultural BMPs
  - Residential/Urban BMPs
- Bacteria
  - Agricultural BMPs
  - Residential/Urban BMPs

# Addressing Sediment:



# Potential Sediment Practices:

## Agricultural

Practice type	Practice description	Sediment reduction	Cost/Unit
Livestock exclusion	Livestock exclusion with narrow buffer and grazing mgmt. (SL-6N)	40%	\$75,000/system
	Livestock exclusion with wide buffer and grazing mgmt. (SL-6W)		
	Livestock exclusion with buffer, no off-stream water		
Pasture practices	Pasture Management (SL-9, SL-10)	30%	\$150/acre
	Streamside buffer: grass and shrub	48%, LU Change	Variable
	Streamside buffer: forested	48%, LU Change	Variable
	Permanent vegetative cover on critical areas (SL-11)	LU Change	\$2,000/acre
	Afforestation of erodible pasture (FR-1)	LU Change	\$570/acre
Cropland practices	Long term vegetative cover on cropland (SL-1)	LU Change	\$300/acre
	Continuous no-till (SL-15B)	70%	\$100/acre
	Cover crop (SL-8B, SL-8H)	20%	\$40/acre

# What needs to be done to address Agricultural sources of Sediment?

1. What is the level of interest in installing best management practices (BMPs)? What % are interested in 10-, 25-, 35-, 50-foot buffers? What types of practices do they prefer?
2. What are the BMPs on the list that are likely to generate the most interest? Least interest?
3. Are there any BMPs of interest that you are not seeing on our list?
4. Is there interest in rotational grazing systems? Other pasture management practices?
5. Is there interest in converting poor pasture or erodible cropland to forest?

# Potential Sediment Practices:

## Urban/Residential

Practice description	Sediment reduction	Phosphorous reduction	Cost/Unit
Bioretention filters	55% - 95%*	55% - 90%*	\$10,000/treated acre
Bioswales	55% - 95%*	75%	\$42,000/treated impervious acre
Dry swales	0%	52% - 76%*	\$18,150/treated acre
Detention basin retrofit	Varies by nature of retrofit	Varies by nature of retrofit	Varies by nature of retrofit
Pervious pavement	55% - 80%*	20% - 85%*	\$240,000/treated acre
Streamside buffer: grass/shrub	48%, LU Change	36%, LU Change	Variable
Streamside buffer: forested	48%, LU Change	36%, LU Change	Variable
Streambank stabilization	44.88 lbs/ft/yr	0.068 lbs/ft/yr	\$750-\$1000 per linear foot

\*- Efficiencies varies based upon design specifications

# What needs to be done to address Urban/Residential sources of Sediment?

1. What is the level of interest in installing best management practices (BMPs)?
2. What are the BMPs on the list that are likely to generate the most interest? Least interest?
3. Are there any BMPs of interest that you are not seeing on our list?



# Addressing Bacteria:

# Potential Bacteria Reduction Practices:

## Agricultural

Practice Type	Practice Description	Bacteria Reduction	Units	Cost / Unit
Cropland Practices	Long Term Vegetative Cover on Cropland (SL-1)	75%	acres	\$300
	Cover Crop (SL-8B, SL-8H)	20%	acres	\$40
Livestock Waste Reduction Practices	Afforestation of Erodible Crop and Pastureland (FR-1)	Land Use Change	acres	\$570
	Small Acreage Grazing System – Equine (SL-6AT)	40%	acres	\$260
	Stream Exclusion with Grazing Land Management (SL-6N, SL-6W)	100%	system	\$75,000
	Pasture Management – Cattle (SL-9, SL-10T)	50%	acres	\$75
	Permanent Vegetative Cover on Critical Areas (SL-11)	75%	acres	\$2,000
	Water Control Structure (WP-1)	70%	acres treated	\$130
	Stream Protection (WP-2N, WP-2W)	100%	system	\$15,000
	Animal Waste Control Facility (WP-4)	40%	system	\$90,000

# What needs to be done to address Agricultural sources of Bacteria?

1. What are the BMPs on the list that are likely to generate the most interest? Least interest?
2. Are there any BMPs of interest that you are not seeing on our list?
3. Is there interest in rotational grazing systems? Other pasture management practices?
4. Is there interest in practices to address manure spreading on crop or pasture fields?
5. Any barriers to implementing stream fencing and improving pasture management in this watershed?

# Potential Bacteria Reduction Practices:

## Residential Wastewater/ Pet Waste

Practice Type	Control Measures	Bacteria Reduction	Units	Cost/Unit
Residential Wastewater	Septic Tank Pump-Out (RB-1)	5%*	System	\$400
	Connection to Public Sewer (RB-2)	100%	System	\$11,000
	Connection to Public Sewer with Pump (RB-2P)		System	\$18,000
	Septic Tank System Repair (RB-3)	100%	System	\$5,000
	Septic Tank System Installation/Replacement (RB-4, RB-4P)	100%	System	\$8,000 - \$12,000
	Alternative On-site Waste Treatment System (RB-5)	100%	System	\$24,000
Pet Waste	Pet Waste Disposal Station (PW-1)	75%	number	\$600
	Pet Waste Treatment (PW-2)	100%	number	\$200
	Pet Waste Treatment for Confined Canine Facilities (PW-3)	100%	number	\$16,000
	Pet Waste Education Program	50%	program	\$5,000

\*Phosphorus removal efficiency is also 5%



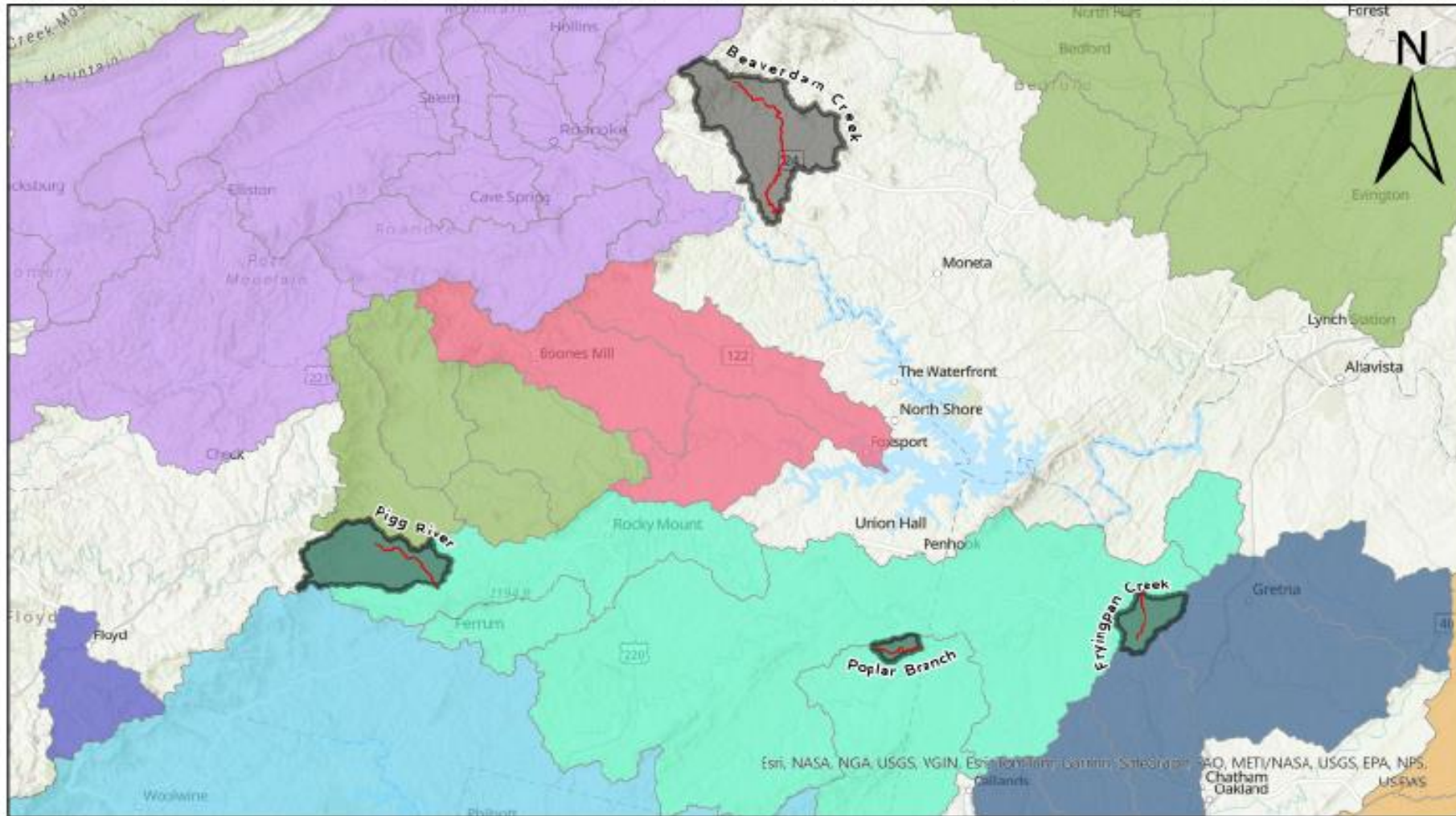
# **What needs to be done to address Residential Wastewater/Pet Waste sources of bacteria?**

1. Are there any particular BMPs that you would prefer to see implemented?
2. What % of failing septic systems need to be repaired vs. replaced?
3. Of the failing systems and straight pipes, what % would require a conventional system vs. an alternative system?
4. What's the possibility to hook up to sewer? Any new projects in future?
5. Is there interest in pet waste stations? Where? What watersheds are kennels located in?

# General Questions

1. What would be the best outreach/education methods to recruit interest? Are there any groups in the watershed that would be good resources for education and outreach?
2. Are there other funding sources (in addition to DCR, NRCS and DEQ) that could help pay for installation of BMPs?
3. What timeline do you think makes sense for this watershed?

# Implementation Plans Near the Pigg River, Poplar Branch, Fryingpan Creek, and Beaverdam Creek Watershed



# What's Next?

- 2<sup>nd</sup> Community Engagement Meeting
  - Mid-June meeting
    - 6/18, 6/20, 6/25, or 6/27
  - Discuss cost estimates for BMPs
  - Determine overall selection of BMPS
  - Scope out pilot projects
  - Identify outreach strategies
  - Discuss timeline for implementation



Contact me with any other thoughts, questions, and/or comments!

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