1st Community Engagement Meeting for the development of a Clean Up Plan (Implementation Plan) for the

North Fork Rivanna River Watershed

December 13th, 2023

DEQ Central Regional Office Valley Region

Madison Whitehurst

TMDL NPS Data Coordinator

Virginia Department of Environmental Quality

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, phosphorous, and bacteria in the watershed
  - Prioritizing BMPs for inclusion in the implementation plan
- Next steps

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Virginia's Water Quality Process

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Reviewing the TMDLs

2008 Bacteria TMDL

Bacteria TMDL Development for the Rivanna River Mainstem, North Fork Rivanna River, Preddy Creek and Tributaries, Meadow Creek, Mechums River, and Beaver Creek Watersheds

Submitted by

Virginia Department of Environmental Quality

Prepared by

THE Louis Berger Group, INC.
2445 M Street, NW Washington, DC 20037

Final Report
March 2008

2018 Benthic TMDL

Benthic TMDL Development for the North Fork Rivanna River Watershed and Tributaries Located in Albemarle, Greene, and Orange Counties

Prepared by:
James Madison University
and
EEE Consulting, Inc.

Prepared for:
Virginia Department of Environmental Quality

April 2019

3e EEE Consulting, Inc.
Environmental, Engineering and Educational Solutions

JAMES MADISON UNIVERSITY

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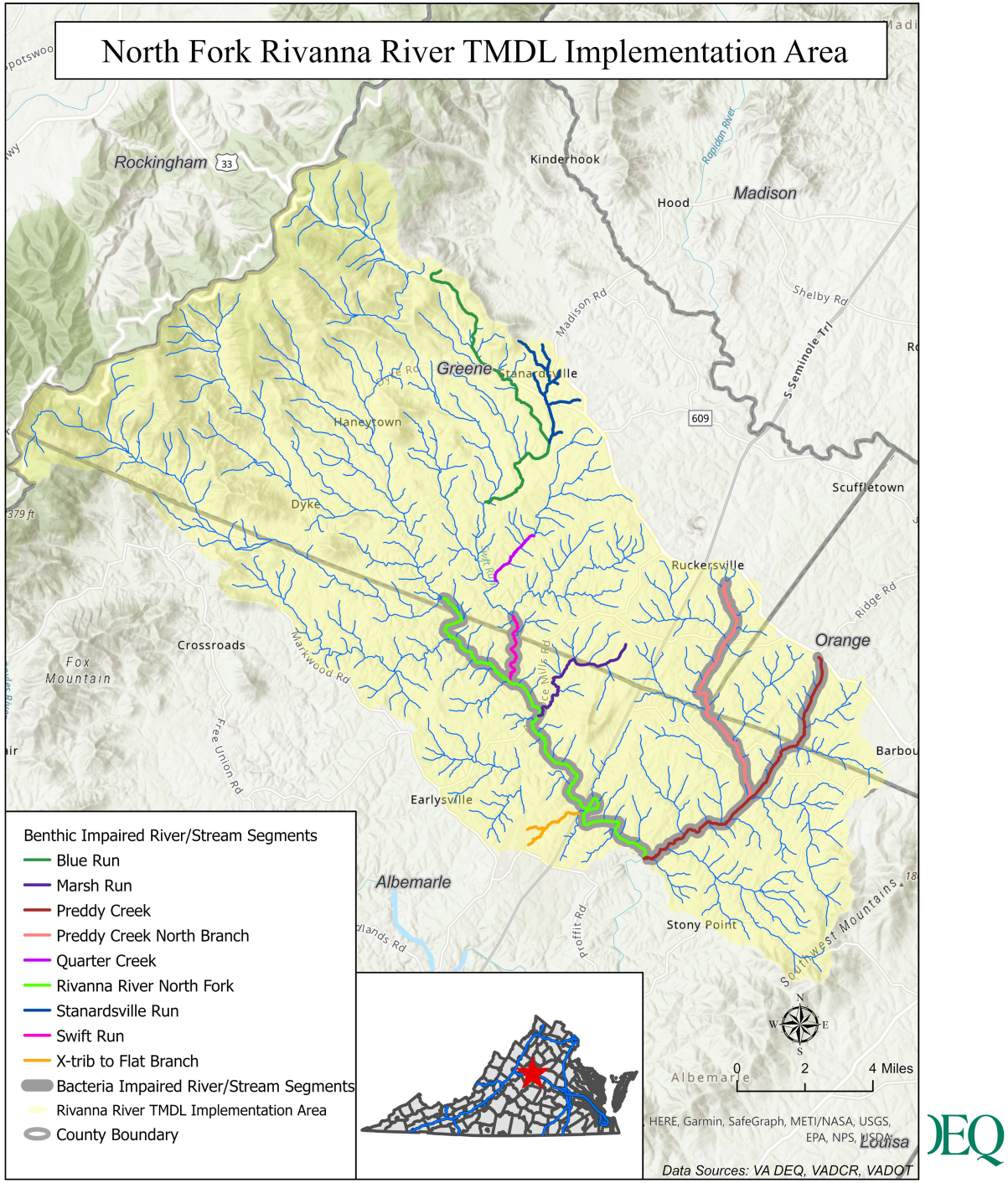
Impaired Stream Segments

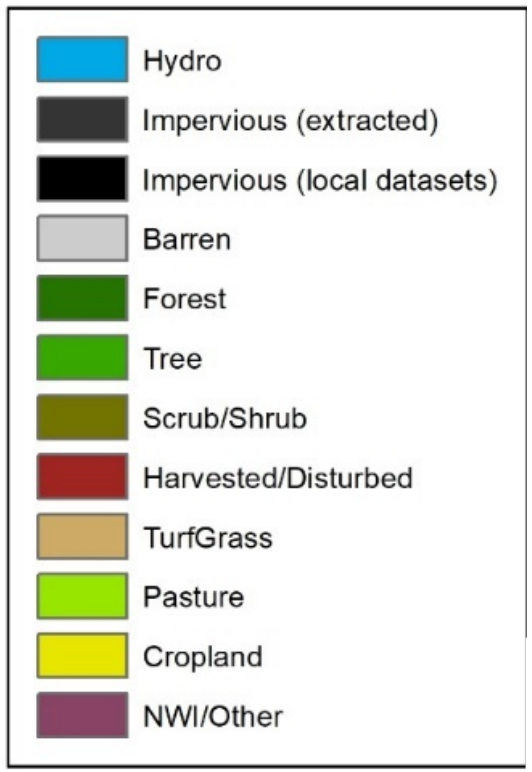
Impaired Streams	Initial Listing Year (Benthic)	Initial Listing Year (Bacteria)
Blue Run*	2012	
Marsh Run	2010	
Preddy Creek	2016	2006
Preddy Creek North Branch	2010	2006
Quarter Creek	2016	
North Fork Rivanna River	2016	2006
Stanardsville Run*	2014	
Swift Run	2012	2010
X-Trib to Flat Branch	2010	

***- TMDL developed for both Sediment and Phosphorus**



From the TMDL study:

Land Use



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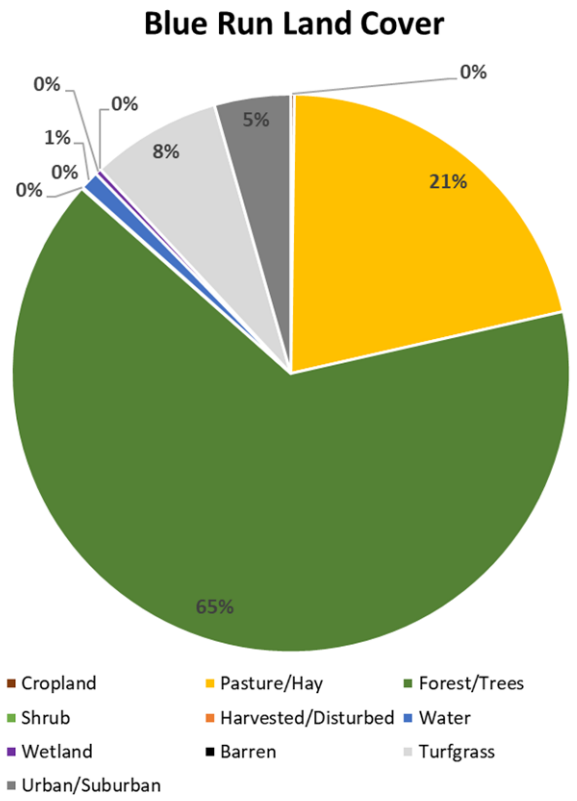
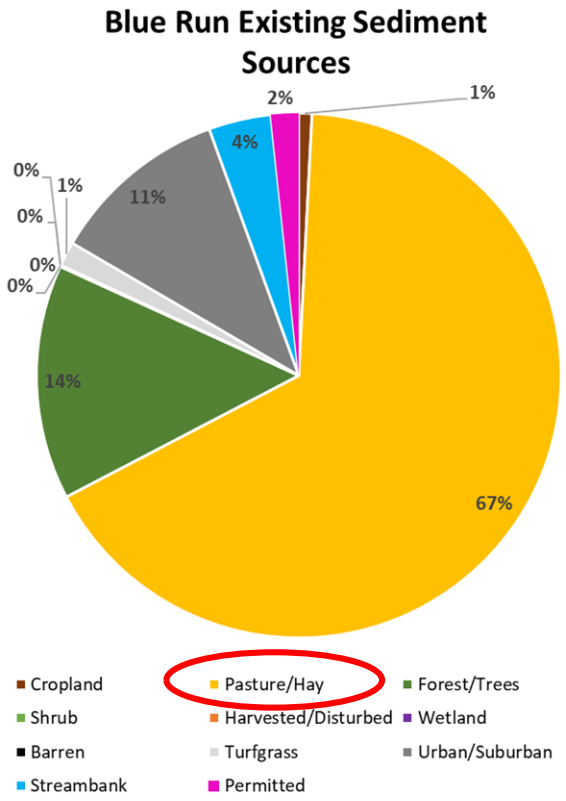
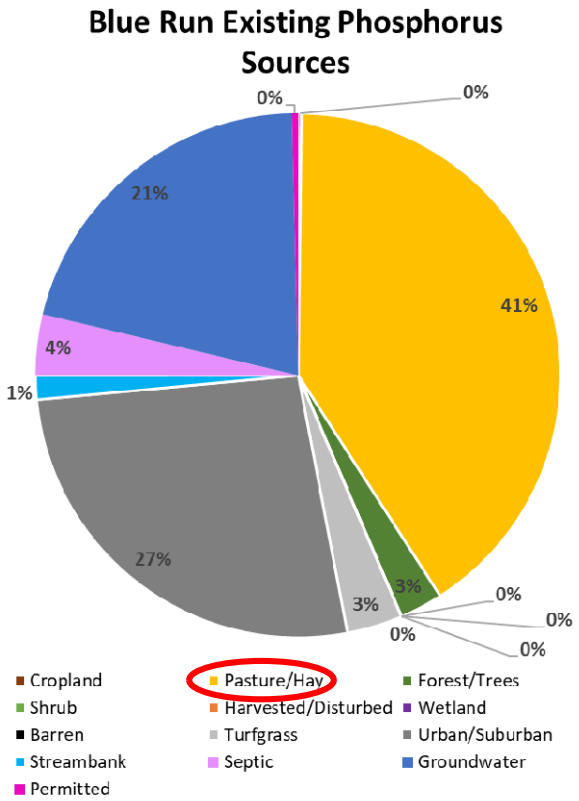
From the TMDL study: Blue Run







Land Use Category	Blue Run Watershed	
	Acres	%
High till	1	0.0%
Low till	11	0.2%
Hay	548	9.1%
Pasture-good	69	1.1%
Pasture-fair	372	6.2%
Pasture-poor	290	4.8%
Forest	3088	51.3%
Tree	834	13.8%
Scrub/Shrub	6	0.1%
Harvested-Disturbed	0	0.0%
Water	65	1.1%
NWI/other	22	0.4%
Barren	0	0.0%
Turfgrass	454	7.5%
Developed-Pervious	38	0.6%
Developed-Impervious	88	1.5%
Impervious	140	2.3%

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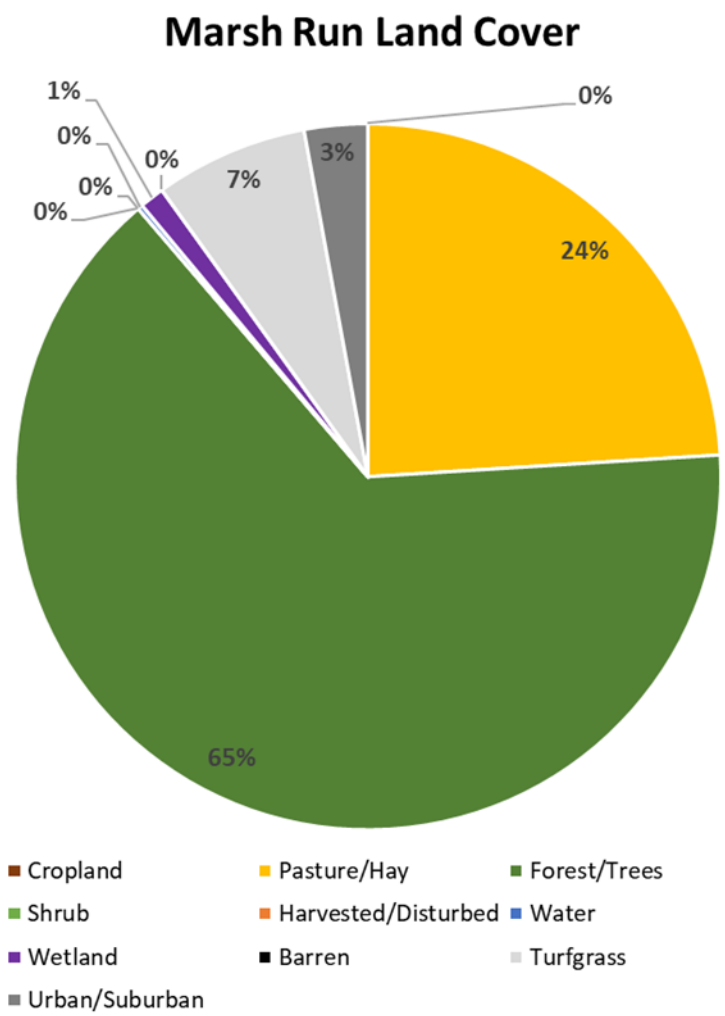
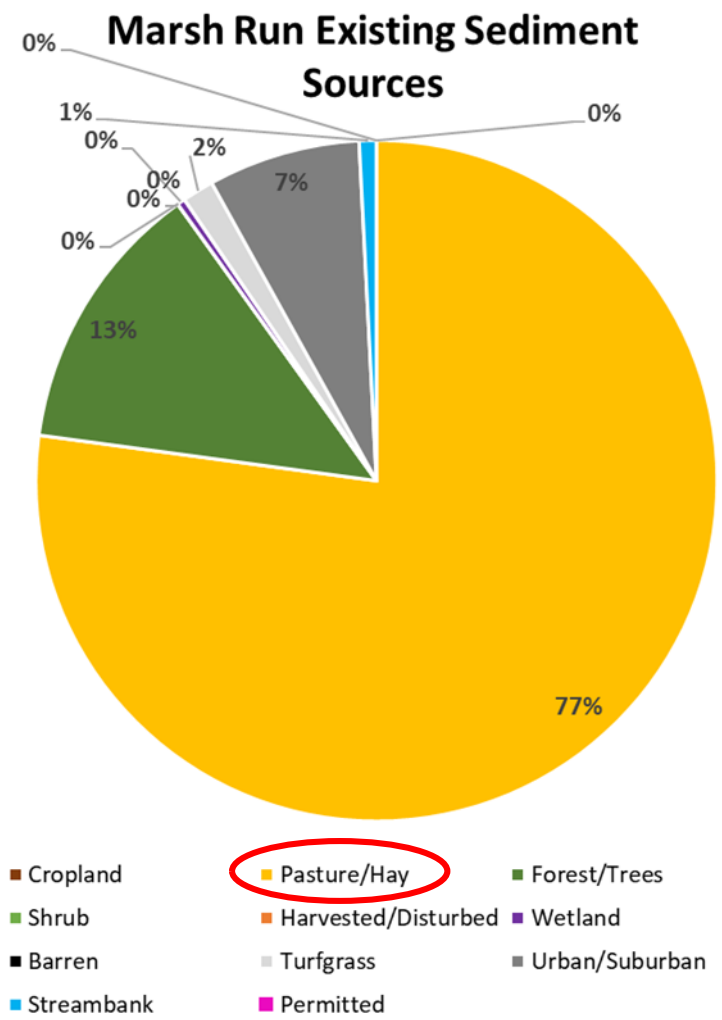
From the TMDL study: Marsh Run





Land Use Category	Marsh Run Watershed	
	Acres	%
High till	0	0.0%
Low till	0	0.0%
Hay	87	7.1%
Pasture-good	11	0.9%
Pasture-fair	59	4.8%
Pasture-poor	46	3.7%
Forest	405	33.0%
Tree	268	21.8%
Scrub/Shrub	0	0.0%
Harvested-Disturbed	0	0.0%
Water	14	1.2%
NWI/other	3	0.3%
Barren	0	0.0%
Turfgrass	214	17.4%
Developed-Pervious	18	1.4%
Developed-Impervious	41	3.4%
Impervious	62	5.0%

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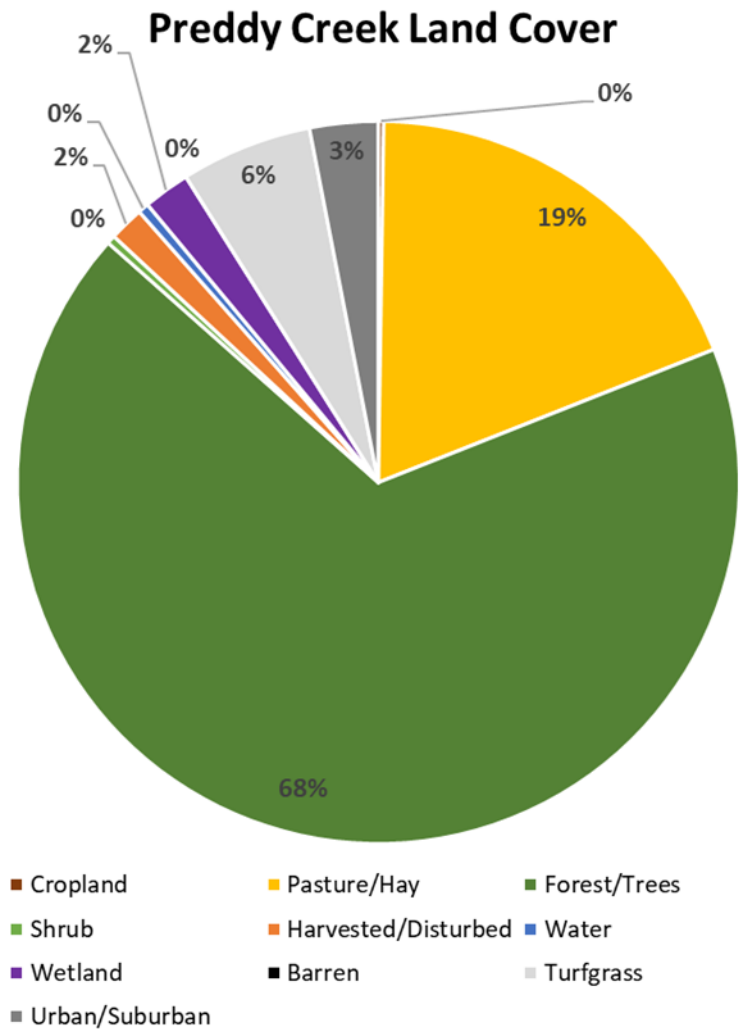
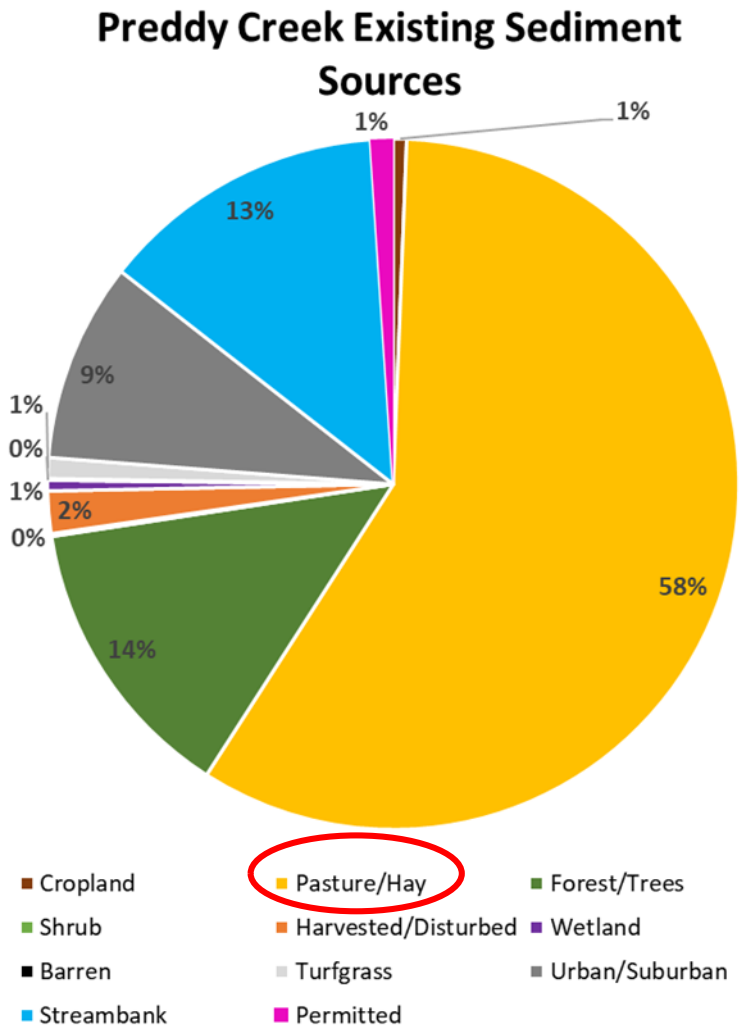
From the TMDL study: Preddy Creek





Land Use Category	Preddy Creek Watershed	
	Acres	%
High till	7	0.0%
Low till	53	0.2%
Hay	1552	6.1%
Pasture-good	339	1.3%
Pasture-fair	2253	8.9%
Pasture-poor	600	2.4%
Forest	14255	56.4%
Tree	2833	11.2%
Scrub/Shrub	97	0.4%
Harvested-Disturbed	394	1.6%
Water	121	0.5%
NWI/other	529	2.1%
Barren	1	0.0%
Turfgrass	1488	5.9%
Developed-Pervious	106	0.4%
Developed-Impervious	247	1.0%
Impervious	421	1.7%

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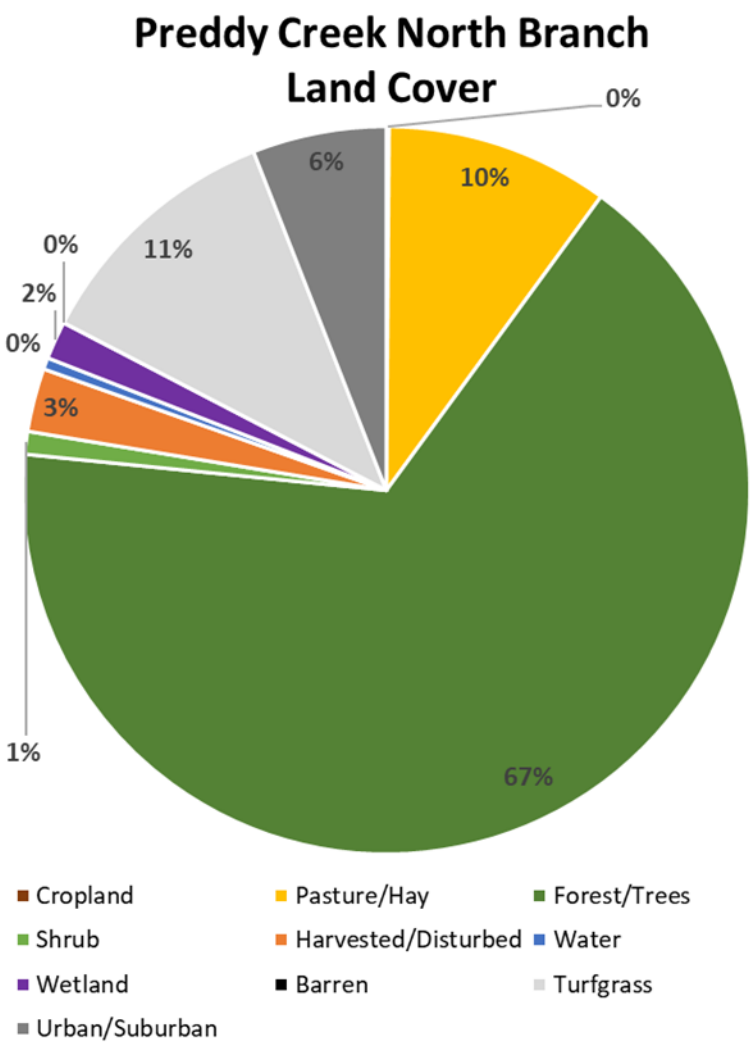
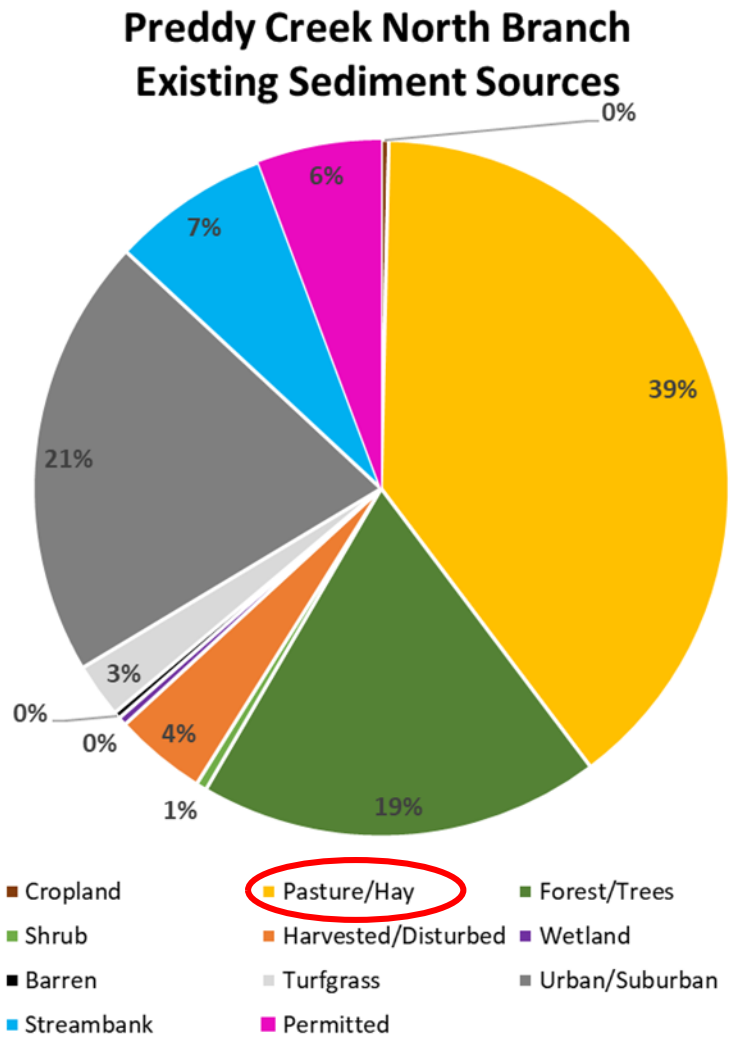
From the TMDL study: Preddy Creek North Branch





Land Use Category	Preddy Creek North Branch Watershed	
	Acres	%
High till	1	0.0%
Low till	9	0.1%
Hay	288	3.2%
Pasture-good	63	0.7%
Pasture-fair	418	4.7%
Pasture-poor	111	1.3%
Forest	4445	50.2%
Tree	1453	16.4%
Scrub/Shrub	90	1.0%
Harvested-Disturbed	250	2.8%
Water	46	0.5%
NWI/other	150	1.7%
Barren	1	0.0%
Turfgrass	1012	11.4%
Developed-Pervious	81	0.9%
Developed-Impervious	188	2.1%
Impervious	259	2.9%

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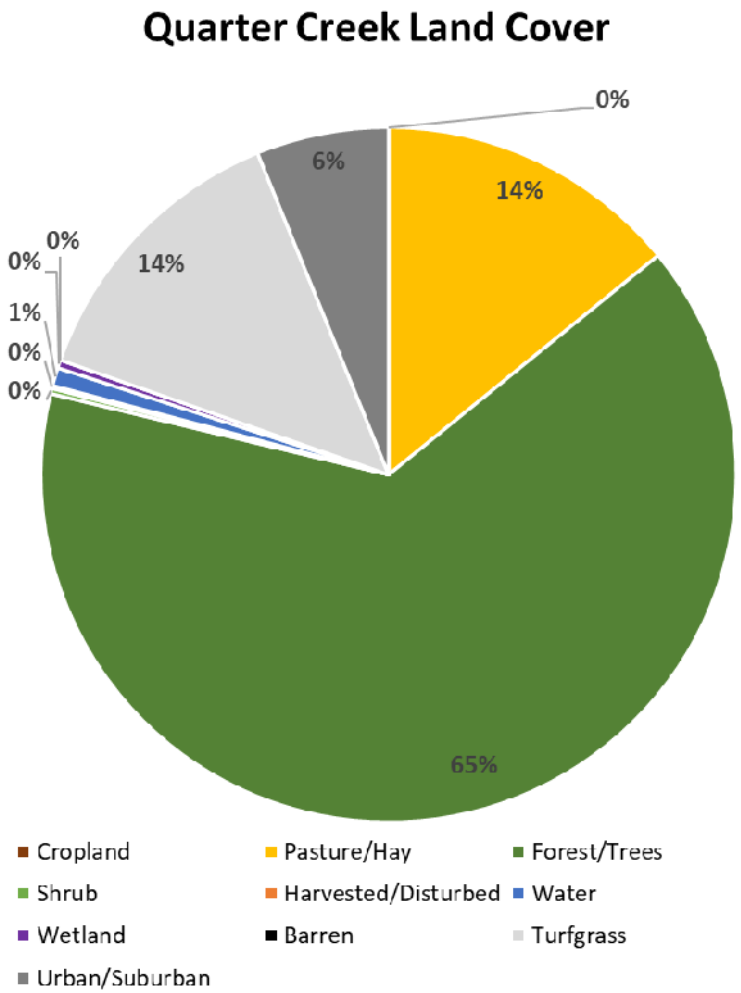
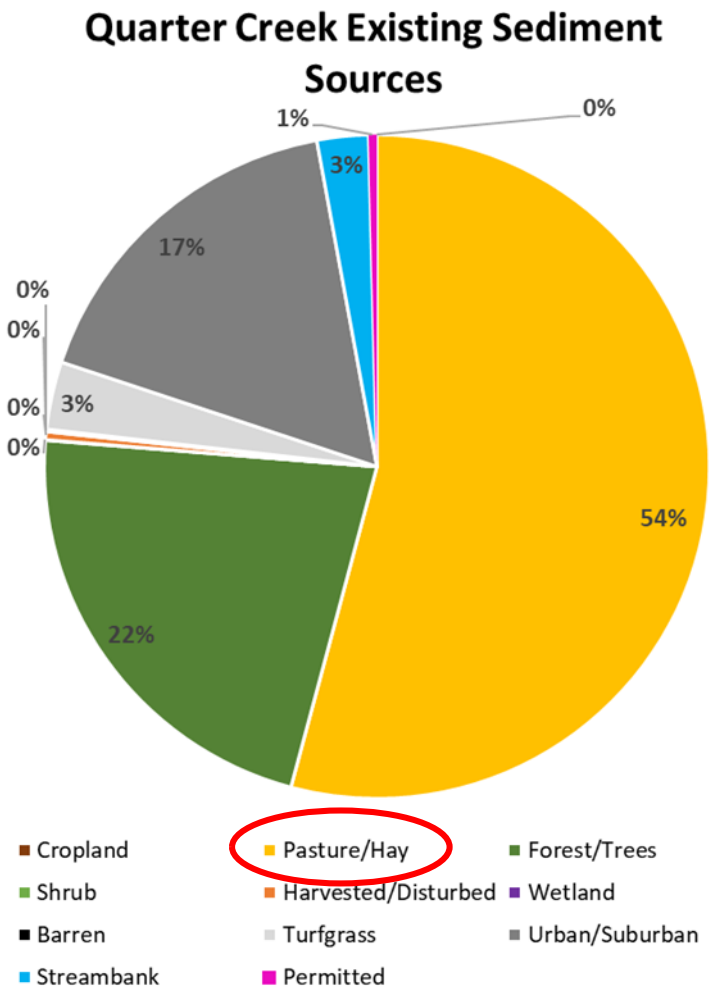
From the TMDL study: Quarter Creek





Land Use Category	Quarter Creek Watershed	
	Acres	%
High till	0	0.0%
Low till	0	0.0%
Hay	214	6.1%
Pasture-good	27	0.8%
Pasture-fair	145	4.1%
Pasture-poor	113	3.2%
Forest	1580	44.8%
Tree	701	19.9%
Scrub/Shrub	9	0.2%
Harvested-Disturbed	5	0.1%
Water	30	0.8%
NWI/other	13	0.4%
Barren	0	0.0%
Turfgrass	476	13.5%
Developed-Pervious	37	1.0%
Developed-Impervious	85	2.4%
Impervious	95	2.7%

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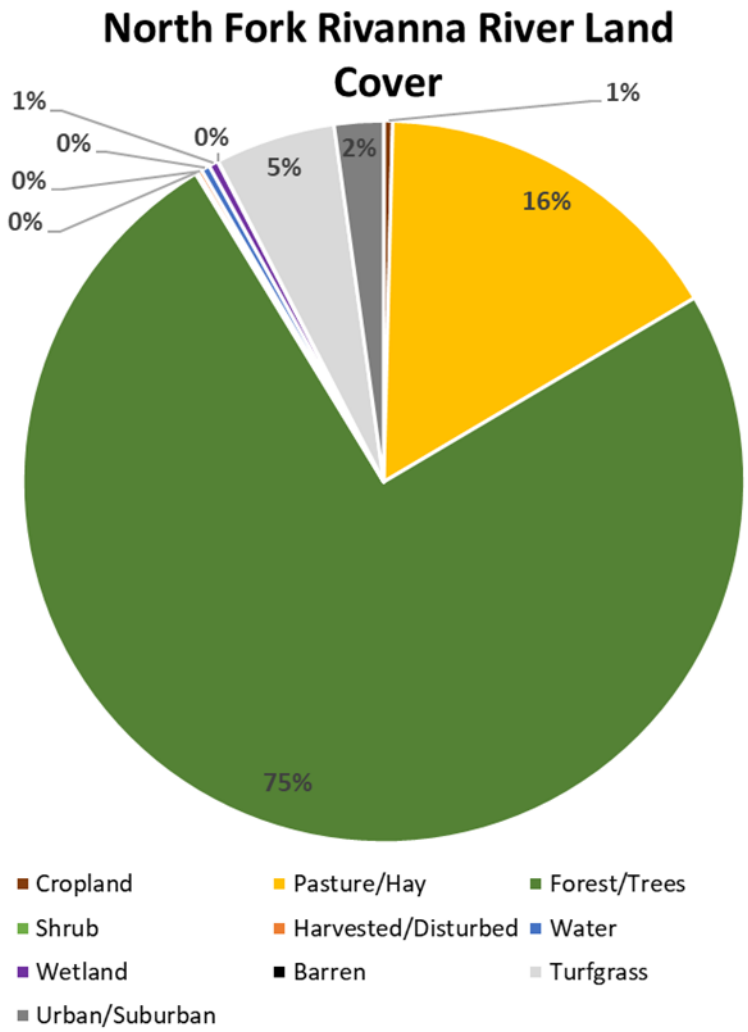
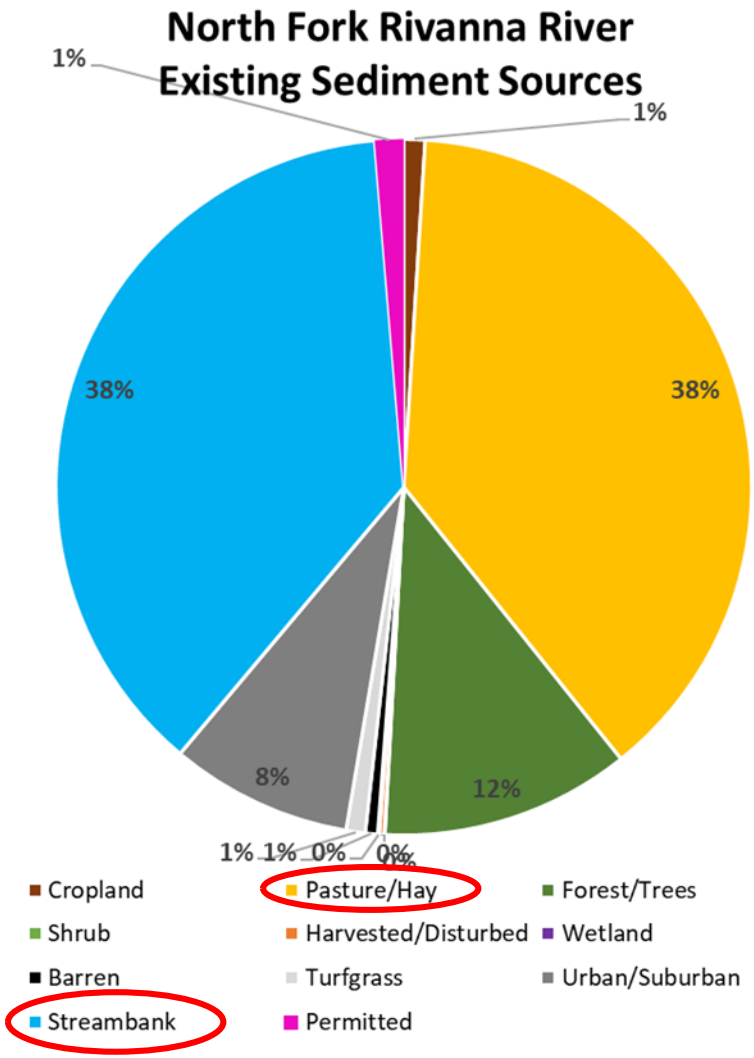
From the TMDL study: North Fork Rivanna River





Land Use Category	North Fork Rivanna River Watershed	
	Acres	%
High till	27	0.0%
Low till	248	0.4%
Hay	4618	6.7%
Pasture-good	1008	1.5%
Pasture-fair	2861	4.1%
Pasture-poor	2677	3.9%
Forest	45345	65.4%
Tree	6538	9.4%
Scrub/Shrub	74	0.1%
Harvested-Disturbed	137	0.2%
Water	269	0.4%
NWI/other	289	0.4%
Barren	17	0.0%
Turfgrass	3732	5.4%
Developed-Pervious	190	0.3%
Developed-Impervious	444	0.6%
Impervious	896	1.3%

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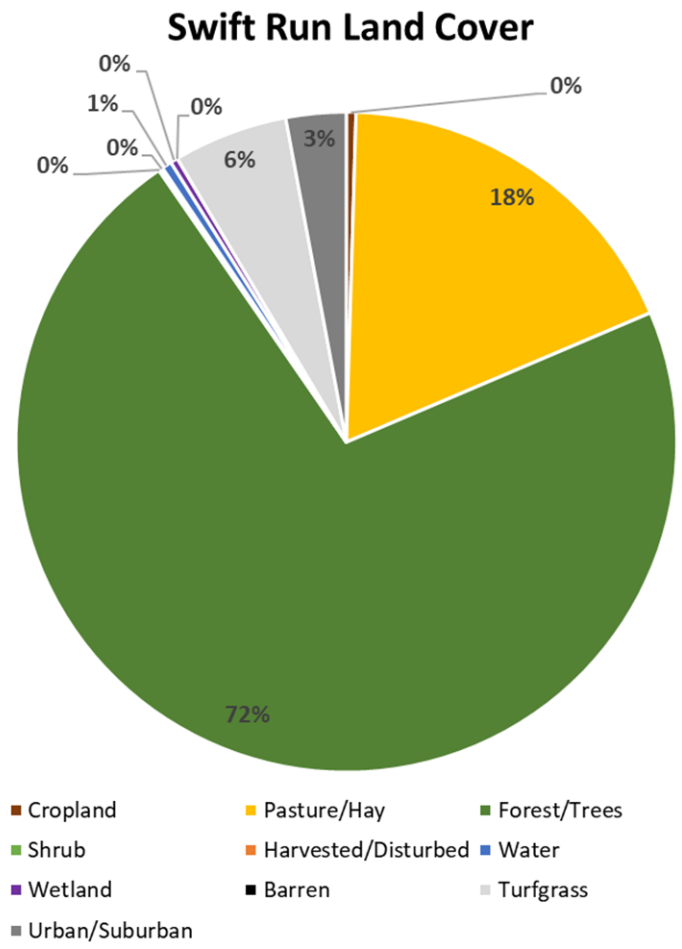
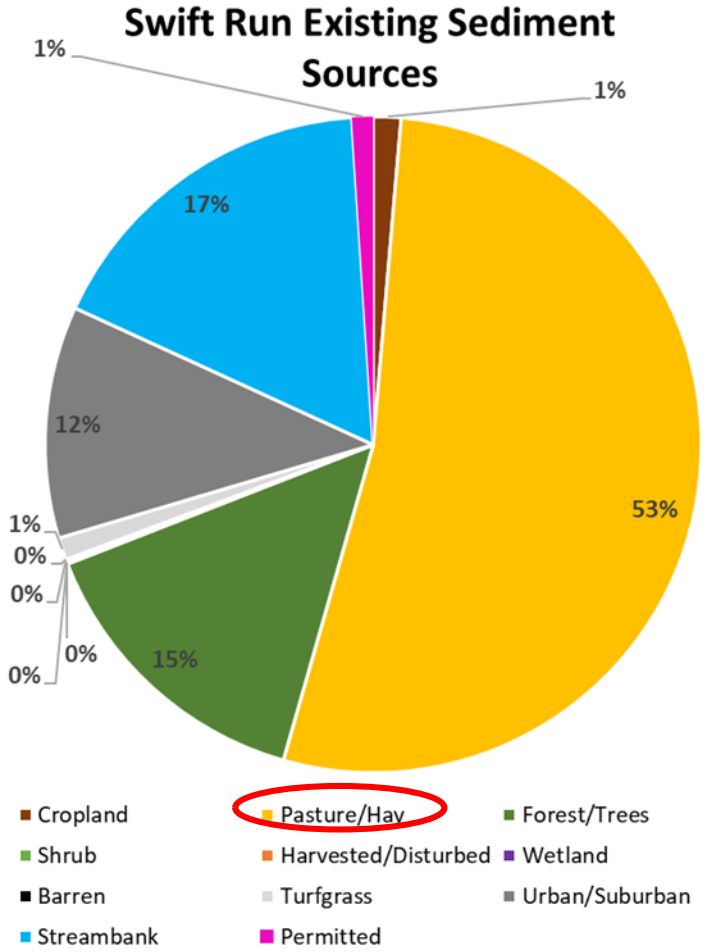
From the TMDL study: Swift Run





Land Use Category	Swift Run Watershed	
	Acres	%
High till	15	0.1%
Low till	113	0.4%
Hay	2118	7.8%
Pasture-good	267	1.0%
Pasture-fair	1435	5.3%
Pasture-poor	1119	4.1%
Forest	16502	60.6%
Tree	3067	11.3%
Scrub/Shrub	31	0.1%
Harvested-Disturbed	28	0.1%
Water	131	0.5%
NWI/other	99	0.4%
Barren	0	0.0%
Turfgrass	1527	5.6%
Developed-Pervious	114	0.4%
Developed-Impervious	266	1.0%
Impervious	423	1.6%

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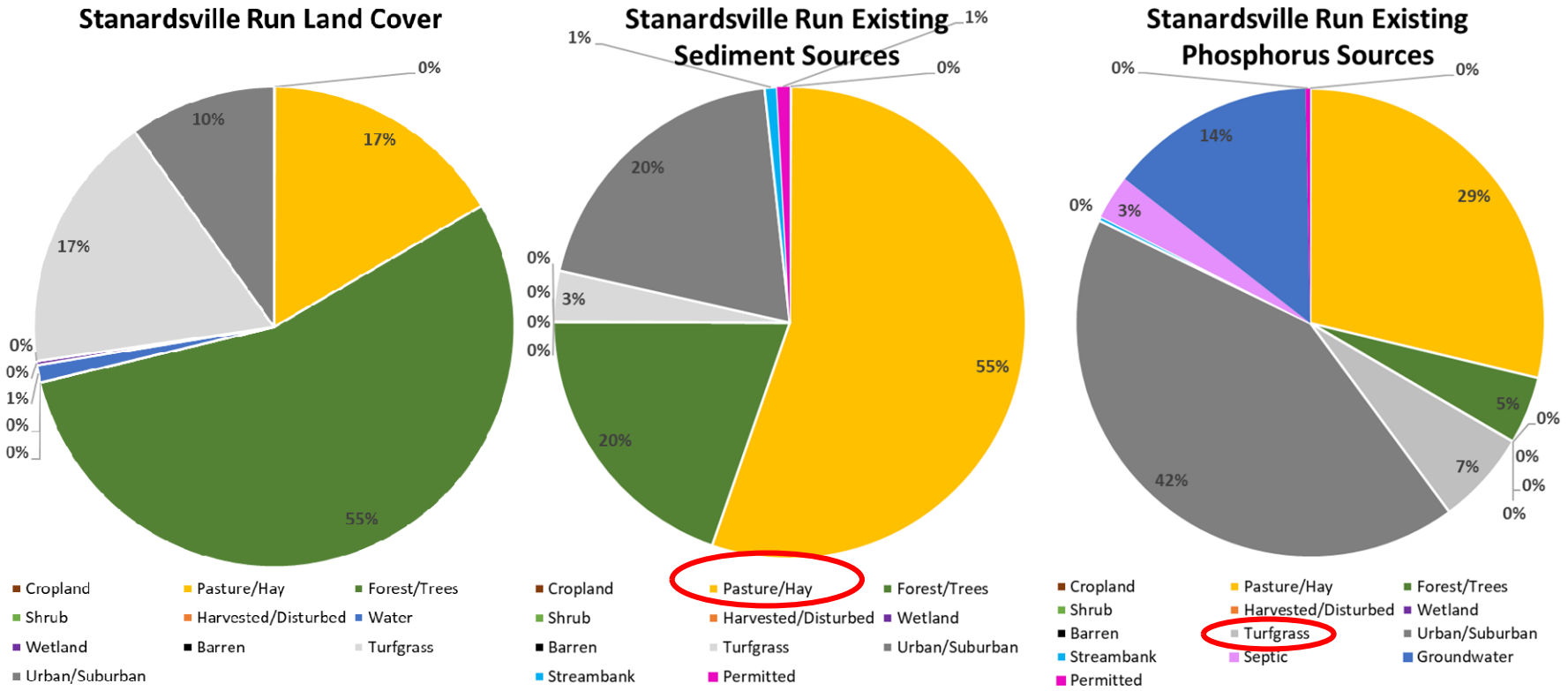
From the TMDL study: Stanardsville Run



Land Use Category	Stanardsville Run Watershed	
	Acres	%
High till	0	0.0%
Low till	0	0.0%
Hay	87	7.1%
Pasture-good	11	0.9%
Pasture-fair	59	4.8%
Pasture-poor	46	3.7%
Forest	405	33.0%
Tree	268	21.8%
Scrub/Shrub	0	0.0%
Harvested-Disturbed	0	0.0%
Water	14	1.2%
NWI/other	3	0.3%
Barren	0	0.0%
Turfgrass	214	17.4%
Developed-Pervious	18	1.4%
Developed-Impervious	41	3.4%
Impervious	62	5.0%

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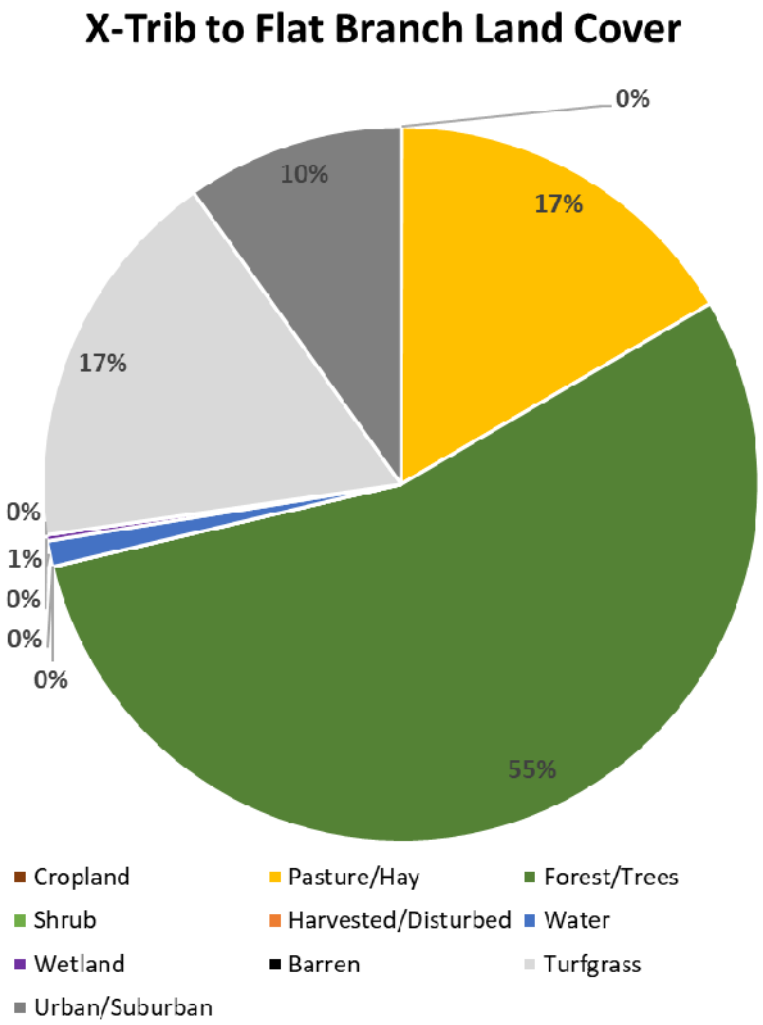
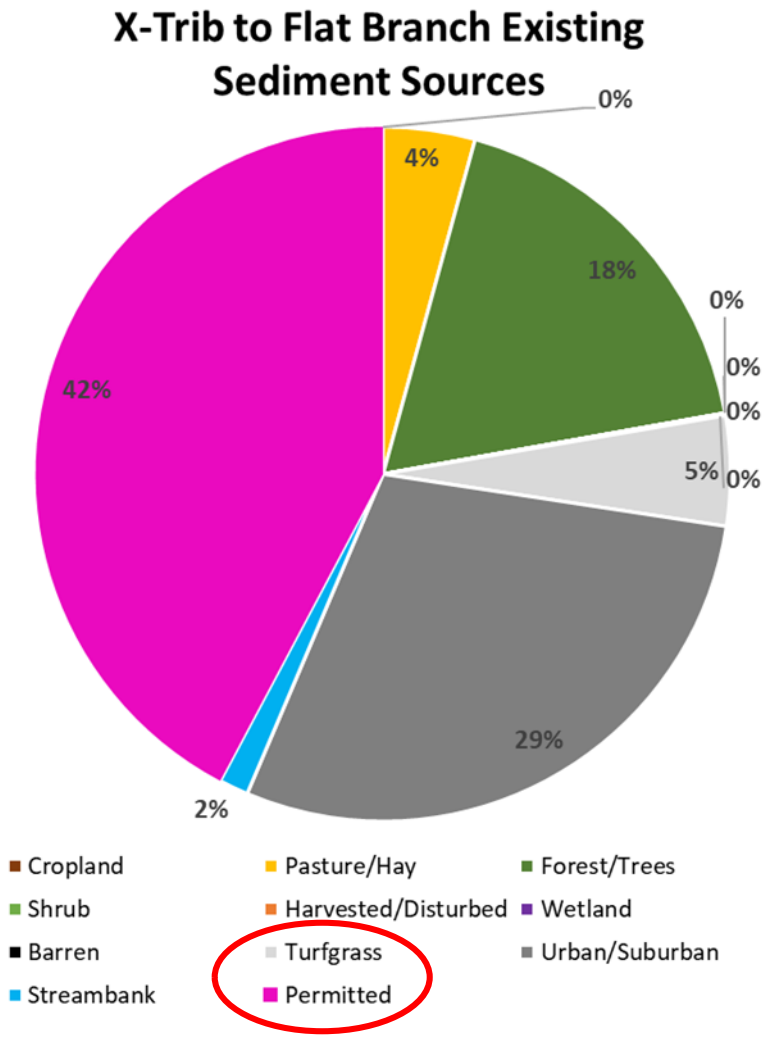
From the TMDL study: X Trib to Flat Branch





Land Use Category	X Trib to Flat Branch Watershed	
	Acres	%
High till	0	0.0%
Low till	0	0.0%
Hay	3	0.5%
Pasture-good	1	0.1%
Pasture-fair	3	0.5%
Pasture-poor	1	0.1%
Forest	291	47.3%
Tree	73	11.9%
Scrub/Shrub	0	0.0%
Harvested-Disturbed	0	0.0%
Water	4	0.7%
NWI/other	0	0.0%
Barren	0	0.0%
Turfgrass	122	19.7%
Developed-Pervious	25	4.1%
Developed-Impervious	58	9.5%
Impervious	35	5.7%

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From the TMDL study: Sediment Load Reductions

Watershed	Percent (%) Reduction in Sediment Loads Needed					
	Crop, Pasture, Hay, and Harvested Forest	Forest, Trees, Shrubs, and Wetland	Developed Pervious and Impervious Areas and Turfgrass	Streambank Erosion	Permitted Urban Areas (MS4)	Other Permitted Sources
Blue Run	71.5	0	45.0	71.5	n/a	0
Marsh Run	70.0	0	37.5	70.0	n/a	0
Preddy Creek	13.2	0	5.0	13.2	n/a	0
Preddy Creek North Branch	57.3	0	40.4	57.3	n/a	0
Quarter Creek	70.7	0	50.0	70.7	n/a	0
Stanardsville Run	76.8	0	60.0	76.8	n/a	0
Swift Run	18.7	0	5.0	18.7	n/a	0
X-Trib to Flat Branch	50.1	0	50.1	50.1	50.1	0

DEQ

From the TMDL study: Phosphorous Load Reductions

Watershed	Percent (%) Reduction in Phosphorus Loads Needed					
	Crop, Pasture, Hay, and Harvested Forest	Forest, Trees, Shrubs, Wetland	Developed Pervious and Impervious Areas and Turfgrass	Streambank Erosion	Permitted Urban Areas (MS4)	Other Permitted Sources
Blue Run	50.0	0	42.5	50.0	n/a	0
Stanardsville Run	67.8	0	67.8	67.8	n/a	0

DEQ

From the TMDL study: Bacteria Load Reductions

Watershed	Percent (%) Reduction in Phosphorus Loads Needed			
	Human Sources (failed septic systems and straight pipes)	Livestock (Direct Instream Loading)	Agricultural and urban nonpoint sources	Wildlife (Direct Instream Loading)
North Fork Rivanna River	100	100	95	76
Swift Run[1]	100	100	95	76
Preddy Creek	100	100	95	72

1- Swift Run bacteria impairment listed in 2010, following competition of bacteria TMDL, reductions for NF Rivanna apply as Swift Run is within NF Rivanna watershed.

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Any Questions?

Now, what's happened since those TMDLs?

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Sediment & Phosphorous BMPs Implemented since 2018

Practice	Number	VACS Code	Amount	Units
Bioretention	6		99.4	Acres
Dry Detention ponds	2		1.94	Acres
Dry Swale*	1		0.34	Acres
Grazing Land Management	5	SL-9/SL-10	283.7	Acres
Proprietary Stormwater Treatment Device	4		3.2	Acres
Riparian Forest Buffer	1		3.27	Acres
Small Grain and Mixed Cover Crop	1	SL-8B	17.8	Acres
Stream Exclusion with Narrow Buffer	1	SL-6N	3,724	Linear feet
Stream Exclusion with Wide Buffer	10	SL-6W	50,580	Linear feet
Stream Protection Fencing with Wide Buffer	1	WP-2W	9,285	Linear feet
Wet Pond	1		20.3	Acres

* Only treats Phosphorous

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Bacteria BMPs Implemented since 2008

BMP Name	Number	VACS Code	Amount	Units
Bioretention	13		107.27	Acres
Septic Tank Pump out	15	RB-1	N/A	System
Conventional Onsite Sewage System Repair	1	RB-3	N/A	System
Conventional Onsite Sewage Systems Full Inspection and Non-permitted Repair	1	RB-3R	N/A	System
Conventional Onsite Sewage System Installation/Replacement	3	RB-4	N/A	System
Conventional Onsite Sewage System Installation/Replacement with Pump	2	RB-4P	N/A	System
Dry Detention Pond	3		9.71	Acres
Grazing Land Management	5	SL-9/SL-10	283.7	Acres
Proprietary Stormwater Treatment Device	4		3.2	Acres
Riparian Forest Buffer	1		3.3	Acres
Small Grain and Mixed Cover Crop	1	SL-8B	17.8	Acres
Stream Exclusion with Narrow Buffer	1	SL-6N	3,724	Linear feet
Stream Exclusion with Wide Buffer	10	SL-6W	50,580	Linear feet
Stream Protection Fencing with Wide Width Buffer	1	WP-2W	9,285	Linear feet
Wet Pond	1		20.3	Acres

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Agriculture statistics: Change since Bacteria TMDL

National Agricultural Statistics Service, NASS (TMDL, 2008):

	Albemarle			Greene			Orange			Rockingham		
Item	2002	2020	% Change	2002	2020	% Change	2002	2020	% Change	2002	2020	% Change
Cattle/Calves	22,725	17,179	-24	8,667	5,881	-32	23,735	16,021	-33	119,938	58,851	-51
Swine	101	-	-100	(D)	-	(D)	213	-	-100	2,853	-	-100
Chickens Layers	1,109	-	-100	326	-	-100	958	-	-100	804,025	2,592,718	222
Chickens Broilers	22	-	-100	22	-	-100	(D)	-	(D)	16,751,524	15,264,578	-9
Turkeys	24	-	-100	(D)	61,552	(D)	183,451	270,560	47	3,280,263	2,876,137	-12
Horses	2,758	1,981	-28	321	248	-23	1,343	941	-30	2,541	2,035	-20

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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?

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Residential Overview

Within the North Fork Rivanna River watershed, estimated totals (TMDL, 2019):

Watershed	Total Septic Systems	Houses with Failing Septic Systems	Houses with Straight Pipes
Preddy Creek	2,474	84	0
North Preddy	1,775	60	0
Stanardsville Run	118	4	0
Blue Run	527	18	0
Swift Run	2,132	72	0
NF Rivanna	3,623	123	0

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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. Have there been expansions in sewer coverage since the TMDLs?
3. Is there plan for future expansion of sewer coverage in the watershed?
4. Is there any data regarding straight pipes in the watershed?

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Prioritizing BMPs for this Implementation Plan

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

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Addressing Sediment and Phosphorus:

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Potential Sediment/Phosphorus Practices:

Agricultural

Practice type	Practice description	Sediment reduction	Phosphorous reduction	Cost/Unit
Livestock exclusion	Livestock exclusion with narrow buffer and grazing mgmt.	40%	30%	$75,000/system
	Livestock exclusion with wide buffer and grazing mgmt.			
	Livestock exclusion with buffer, no off-stream water			
Pasture practices	Pasture Management	30%	24%	$21,000/system
	Streamside buffer: grass and shrub	48%, LU Change	36%, LU Change	Variable
	Streamside buffer: forested	48%, LU Change	36%, LU Change	Variable
	Permanent vegetative cover on critical areas	LU Change	LU Change	$1,200/acre
	Afforestation of erodible pasture	LU Change	LU Change	$570/acre
Cropland practices	Long term vegetative cover on cropland	LU Change	LU Change	$220/acre
	Continuous no-till	70%	30%	$100/acre
	Cover crop	20%	15%	$40/acre

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What needs to be done to address Agricultural sources of Sediment and Phosphorus?

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?

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Potential Sediment/Phosphorus 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

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

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?

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Addressing Bacteria:

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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	$220
	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	$2,540
	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	$150,000

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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?

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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%

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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?

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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?

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What's Next?

- 2nd Community Engagement Meeting
  - Mid-February meeting
  - Discuss cost estimates for BMPs
  - Determine overall selection of BMPS
  - Scope out pilot projects
  - Identify outreach strategies
  - Discuss timeline for implementation

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Any other thoughts or questions, contact me!

Madison Whitehurst

VDEQ – Central Regional Office

Madison.Whitehurst@deq.virginia.gov

(804)-489-8796

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