

# Upper York River Basin Watershed Implementation Plan

## AGRICULTURAL & RESIDENTIAL WORKING GROUPS MEETING

May 10, 2011

**Table 1. Existing livestock exclusion fencing and estimated exclusion fencing length needed in each impairment.**

Estimated Fencing	Beaver Creek	Mountain Run	Pamunkey Creek	Terrys Run	Plentiful Creek	Goldmine Creek	Total
Existing exclusion fencing (ft)	3,396	3,726	26,804	10,003	369	12,021	<b>56,319</b>
One-sided fencing needed (ft)	6,001	36,475	73,884	48,411	12,387	33,633	<b>210,791</b>
Two-sided fencing needed (ft)	16,499	116,318	241,489	115,723	19,510	86,667	<b>596,206</b>
<b>Total Fencing Needed (ft)</b>	<b>22,500</b>	<b>152,793</b>	<b>315,373</b>	<b>164,134</b>	<b>31,897</b>	<b>120,300</b>	<b>806,997</b>

- ★ Perennial stream network was overlaid on aerial photography to identify stream segments that flowed through or adjacent to pastures. Not every pasture has livestock on it at any given point in time. However, it was assumed pasture area has potential for livestock access unless otherwise noted by AWG or district staff.
- ★ **Existing exclusion fencing** = currently installed fencing estimates based on cost-share records and feedback from district and VADCR
- ★ **One-sided fencing** = stream segment flows adjacent to pasture area, it was assumed that fencing was required on only one side of stream
- ★ **Two-sided fencing** = stream segment flows through pasture area, it was assumed that fencing was required on both sides of stream

**Table 2. Estimation of control measures with unit cost (average) needed to meet pasture and cropland bacteria load reductions.**

Control Measure	Unit	Average Streamside Fencing (ft)	Estimated Units Needed (#)						Total
			Beaver Creek	Mountain Run	Pamunkey Creek	Terrys Run	Plentiful Creek	Goldmine Creek	
<b><u>Pasture and Livestock Exclusion</u></b>									
Livestock Exclusion System (CREP)	System	4,400	1	9	18	9	2	7	<b>46</b>
Livestock Exclusion System (EQIP/CBWI)	System	2,150	3	18	37	19	4	14	<b>95</b>
Livestock Exclusion System (LE-1T)	System	2,150	3	18	37	20	4	14	<b>96</b>
Livestock Exclusion System (SL-6AT)	System	1,500	0	1	2	1	0	1	<b>5</b>
Livestock Exclusion System (LE-2T)	System	1,750	3	16	36	19	2	14	<b>90</b>
Livestock Exclusion System (WP-2T)	System	1,950	0	3	6	3	1	2	<b>15</b>
Improved Pasture Management <sup>1</sup>	Acres <sup>3</sup>	-	562	3,991	12,064	5,279	1,433	3,621	<b>26,950</b>
Retention Ponds	Acre <sup>4</sup>	-	269	2,083	6,864	2,898	820	1,948	<b>14,882</b>
<b><u>Cropland<sup>2</sup></u></b>									
Permanent Vegetative Cover on Cropland (SL-1)	Acres <sup>3</sup>	-	1	5	200	55	30	55	<b>346</b>
Reforestation of Erodible Crop and Pastureland (FR-1)	Acres <sup>3</sup>	-	1	5	200	50	30	50	<b>336</b>
Manure / Biosolids Incorporation Into Soil	Acres <sup>3</sup>	-	4	14	1,050	420	272	560	<b>2,320</b>
<b><u>Technical Assistance</u></b>									
Agricultural – Pasture and Cropland	Full Time Equivalent	-	<b>0.66</b>				<b>0.17</b>	<b>0.17</b>	<b>1 /yr</b>

<sup>1</sup> Improved pasture management comprised of: Pasture and Hayland Replanting (512), Pasture Management, and Prescribed Grazing (528) BMPs

<sup>2</sup> Cropland reductions incorporate reduction afforded by four existing liquid manure storage facilities and poultry litter sheds

<sup>3</sup> Acres installed; <sup>4</sup> Acres treated

- ★ Estimated exclusion fencing needed is translated into a livestock exclusion system by dividing estimated exclusion fencing needed by the average streamside fencing length per system to estimate number of exclusion systems needed.
- ★ In order to provide implementation options to producers, several cost-share programs with varying goals and requirements were included.
- ★ A typical Livestock Exclusion System (LE-1T) includes streamside fencing for perennial and intermittent streams, cross-fencing for pasture management, hardened crossing, alternative watering system, watering trough, water distribution piping, and a 35-ft buffer from the stream.

**Table 3. Estimation of control measures with unit cost (average) needed to meet on-site sewage disposal system and pet waste bacteria load reductions.**

Control Measure	Unit	Estimated Units Needed (#)						Total
		Beaver Creek	Mountain Run	Pamunkey Creek	Terrys Run	Plentiful Creek	Goldmine Creek	
<b><u>Failing Septic Systems</u></b>								
Septic Tank Pump-out	System	27	134	179	92	45	37	<b>514</b>
Connection to public sewer	System	0	0	10	0	0	0	<b>10</b>
Septic System Repair	System	16	81	101	55	27	22	<b>302</b>
New Conventional Septic System	System	8	40	51	28	14	11	<b>152</b>
Alternative On-site Sewage Disposal System	System	3	13	17	9	4	4	<b>50</b>
<b><u>Straight Pipes</u></b>								
New Conventional Septic System	System	0	11	19	8	2	9	<b>49</b>
Alternative On-site Sewage Disposal System	System	0	1	2	1	0	1	<b>5</b>
<b><u>Pet Waste Management</u></b>								
Pet waste education program	Program	1			1	1	<b>3</b>	
Pet waste digesters	System	20	20	20	20	20	20	<b>120</b>
Confined Canine Unit Waste Treatment System	System	1	1	2	1	1	1	<b>7</b>
<b><u>Stormwater Runoff Best Management Practices</u></b>								
Vegetated Buffers	Acres Installed	1	16	16	9	2	16	<b>60</b>
Bioretention	Acres Treated	0	5	120	1	1	20	<b>147</b>
Infiltration Trench	Acres Treated	0	2	20	0	0	13	<b>35</b>
<b><u>Technical Assistance</u></b>								
On-site Sewage Disposal Systems	Full Time Equivalent	0.6			0.15	0.15	<b>0.9 /yr</b>	
Pet Waste Management	Full Time Equivalent	0.06			0.02	0.02	<b>0.1 /yr</b>	

Based on feedback from VDH and GWG:

- ★ Septic tank pump-outs equal 100% of failed septic system estimates
- ★ Failing septic system corrections based on: 60% septic system repair, 30% conventional septic system, and 10% alternative sewage disposal system
- ★ Straight pipe corrections based on: 90% conventional septic system and 10% alternative sewage disposal system

**Table 4. Control measures with estimated cost-share program and landowner costs.**

Control Measure	Program Code	Unit	Average Unit Cost (\$)	Cost-share	Average Cost/Unit to State or Federal Program (\$)	Average Cost/Unit to Landowner (\$) <sup>1</sup>
Livestock exclusion with 35 ft buffer	CREP	System	25,000	50% + varied incentive	22,500	2,500 <sup>A</sup>
	EQIP/CBWI	System	19,500	75%	14,625	4,875
	LE-1T	System	19,500	85%	16,575	2,925
Small Acreage Grazing System with 35 ft setback	SL-6AT	System	13,500	50%	6,750	6,750
Livestock exclusion with 10 ft setback	CBWI	System	19,500	75%	14,625	4,875
	LE-2T	System	15,750	50%	7,875	7,875
Stream Protection	WP-2T	System	5,000	75% + \$0.50/ft incentive	4,725	1,250
Pasture and Hayland Re-planting	512	Acres	295	\$165/ac	165	130
Prescribed grazing	528	Acres	70	\$30/ac	30	40
Permanent vegetative cover on cropland	SL-1	Acres	370	75% + varied incentive	313	57
Reforestation of erodible crop and pastureland	FR-1	Acres	450	up to \$300/ac	300	150
Manure / biosolids soil incorporation	N/A	Acres	25	N/A	0	25
Septic Tank Pump-out	RB-1	System	300	50%	150	150
Connection to Public Sewer	RB-2	System	9,000 <sup>B</sup>	50% - 75%	4,500 – 6,750	2,250 - 4,500
Septic Tank System Repair	RB-3	System	4,000	50% - 75%	2,000 – 3,000	1,000 - 2,000
Septic Tank System Installation / Replacement	RB-4	System	8,000	50% - 75%	4,000 – 6,000	2,000 - 4,000
Septic Tank System Installation / Replacement w/ Pump	RB-4P	System	9,000 <sup>B</sup>	50% - 75%	4,500 – 6,750	2,250 - 4,500
Alternative On-site Waste Treatment System	RB-5	System	20,000	50% - 75%	10,000 – 15,000	5,000 - 10,000

<sup>1</sup> Does not include tax credit or in-kind service; <sup>A</sup> Value does not reflect incentive payment; <sup>B</sup> Maximum amount based on allowable upper cost-share amount, cost could be higher

**Table 5. Targeted implementation stage for control measures installation.**

Control Measure	Beaver Creek	Mountain Run	Pamunkey Creek	Terrys Run	Plentiful Creek	Goldmine Creek
<b><u>Pasture and Livestock Exclusion</u></b>						
Livestock Exclusion System (CREP)	I	I	I	I	I	I
Livestock Exclusion System (EQIP/CBWI)	I	I	I	I	I	I
Livestock Exclusion System (LE-1T)	I	I	I	I	I	I
Livestock Exclusion System (SL-6AT)	I	I	I	I	I	I
Livestock Exclusion System (LE-2T)	I	I	I	I	I	I
Livestock Exclusion System (WP-2T)	I	I	I	I	I	I
Improved Pasture Management	I & II	I & II	I & II	I & II	I & II	I & II
Retention Ponds	II	II	II	II	II	II
<b><u>Cropland</u></b>						
Permanent Vegetative Cover on Cropland (SL-1)	I & II	I & II	I & II	I & II	I & II	I & II
Reforestation of Erodible Crop and Pastureland (FR-1)	I & II	I & II	I & II	I & II	I & II	I & II
Manure / Biosolids Incorporation into Soil	II	II	II	II	II	II
<b><u>Failing Septic Systems</u></b>						
Septic Tank Pump-out	I	I	I	I	I	I
Septic System Repair	I	I	I	I	I	I
Connection to Public Sewer	I	I	I	I	I	I
New Conventional Septic System	I	I	I	I	I	I
Alternative On-site Sewage Disposal System	I	I	I	I	I	I
<b><u>Straight Pipes</u></b>						
New Conventional Septic System	I	I	I	I	I	I
Alternative On-site Sewage Disposal System	I	I	I	I	I	I
<b><u>Pet Waste Management</u></b>						
Pet waste education program	I	I	I	I	I	I
Pet waste digesters	I	I	I	I	I	I
Confined Canine Unit Waste Treatment System	I	I	I	I	I	I
<b><u>Stormwater Runoff Best Management Practices</u></b>						
Vegetated Buffers	I & II	I & II	I & II	I & II	I & II	I & II
Bioretention	I & II	I & II	I & II	I & II	I & II	I & II
Infiltration Trench	I & II	I & II	I & II	I & II	I & II	I & II

**Stage I** = instantaneous standard exceedance rate of 10.5% or less, resulting in removal from impaired waters list

**Stage II** = instantaneous & geometric mean standard exceedance rate of 0%, resulting in TMDL source allocation