

Agricultural Best Management Practices

Perennial stream network was overlaid on aerial photography to identify stream segments that flowed through or adjacent to pastures (Figure 1). 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. Stream segments were designated as:

- ★ **No exclusion fencing** = stream segment does not flow adjacent or through pasture area
- ★ **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
- ★ **Existing exclusion fencing** = currently installed fencing based on cost-share records and/or aerial photography
- ★ **Cropland** = open area appears to be a harvestable crop (i.e., hayland or row crop)
- ★ **Open area** = open area does not appear to support livestock (e.g., cutover forest)

Table 1 lists the perennial stream length, existing fencing, and estimated fencing needed to exclude livestock from the streams. Estimated exclusion fencing needed (i.e., one-sided and two-sided) is translated into a livestock exclusion system by dividing estimated exclusion fencing needed by the average streamside fencing length per system (Table 2). In order to provide implementation options to producers, several cost-share programs with varying goals and requirements were included. Table 2 lists the estimated division between various programs. A typical Stream Exclusion with Grazing Land Management (SL-6) includes streamside fencing, 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 lists the estimated installation cost for the livestock exclusion systems. Control measures with estimated cost-share program and landowner costs are shown in Table 4.

Table 1. Perennial stream length, cost-share exclusion fencing installed, and estimated exclusion fencing length needed.

	Garth Run	Rippin Run	Marsh Run	Blue Run	Beautiful Run	Poplar Run	UT to Rapidan River #1	UT to Rapidan River #2	Rapidan River #1	Rapidan River #2	Total
Perennial stream length (mi)	18.8	32.4	51.0	94.4	63.6	20.1	6.0	16.8	28.3	307.7	639.0
Existing exclusion fencing (ft)	11,376	8,488	32,689	37,310	50,429	0	0	44,634	8,196	239,454	432,577
One-sided fencing needed (ft)	6,402	16,525	16,927	52,225	31,629	18,685	8,797	4,700	23,760	121,925	301,575
Two-sided fencing needed (ft)	9,044	32,348	46,559	186,445	74,866	54,786	3,878	7,947	61,422	288,846	766,141
Total Fencing Needed, ft (mi)	15,446 (2.9)	48,873 (9.3)	63,486 (12.0)	238,670 (45.2)	106,495 (20.2)	73,471 (13.9)	12,676 (2.4)	12,647 (2.4)	85,182 (16.1)	410,770 (77.8)	1,067,716 (202.2)
Fencing per stream length (%)	11	19	15	29	21	43	34	10	37	16	20

Table 2. Estimation of livestock exclusion systems needed.

Livestock Exclusion System	Program Division (%)	Average Streamside Fencing (ft)	Estimated Systems Needed (#)										Total (#)
			Garth Run	Rippin Run	Marsh Run	Blue Run	Beautiful Run	Poplar Run	UT to Rapidan River #1	UT to Rapidan River #2	Rapidan River #1	Rapidan River #2	
Livestock Exclusion System (CREP)	16	2,900	1	4	4	13	6	4	1	1	5	23	62
Livestock Exclusion System (EQIP)	7	2,600	0	1	2	6	3	2	0	0	2	11	27
Stream Exclusion with Grazing Land Management (SL-6)	65	4,350	2	7	9	36	16	11	2	2	13	61	159
Small Acreage Grazing System (SL-6A)	1	1,750	1	0	0	2	0	1	0	0	0	2	6
Livestock Exclusion with Reduced Setback (LE-2)	10	2,100	1	2	3	11	5	3	0	1	4	20	50
Stream Protection (WP-2)	1	1,200	0	0	1	2	1	1	0	0	1	4	10

Table 3. Estimation of livestock exclusion systems installation cost.

Livestock Exclusion System	Average Unit Cost (\$)	Estimated Cost (\$)										Total Cost (\$)
		Garth Run	Rippin Run	Marsh Run	Blue Run	Beautiful Run	Poplar Run	UT to Rapidan River #1	UT to Rapidan River #2	Rapidan River #1	Rapidan River #2	
Livestock Exclusion System (CREP)	18,000	18,000	72,000	72,000	234,000	108,000	72,000	18,000	18,000	90,000	414,000	1,116,000
Livestock Exclusion System (EQIP)	15,000	0	15,000	30,000	90,000	45,000	30,000	0	0	30,000	165,000	405,000
Stream Exclusion with Grazing Land Management (SL-6)	35,500	70,000	245,000	315,000	1,260,000	560,000	385,000	70,000	70,000	455,000	2,135,000	5,565,000
Small Acreage Grazing System (SL-6A)	9,000	9,000	0	0	18,000	0	9,000	0	0	0	18,000	54,000
Livestock Exclusion with Reduced Setback (LE-2)	12,000	12,000	24,000	36,000	132,000	60,000	36,000	0	12,000	48,000	240,000	600,000
Stream Protection (WP-2)	2,500	0	0	2,500	5,000	2,500	2,500	0	0	2,500	10,000	25,000
Stream exclusion (CCI-SE-1)	1	26,900	57,400	96,000	275,800	156,700	73,800	11,600	58,300	93,900	649,700	1,500,100
Forested riparian buffer (CCI-FRB-1)	100	1,000	3,600	4,600	17,900	7,900	5,400	900	900	6,400	30,600	79,200
Total Cost (\$)		136,900	417,000	556,100	2,032,700	940,100	613,700	100,500	159,200	725,800	3,662,300	9,344,300

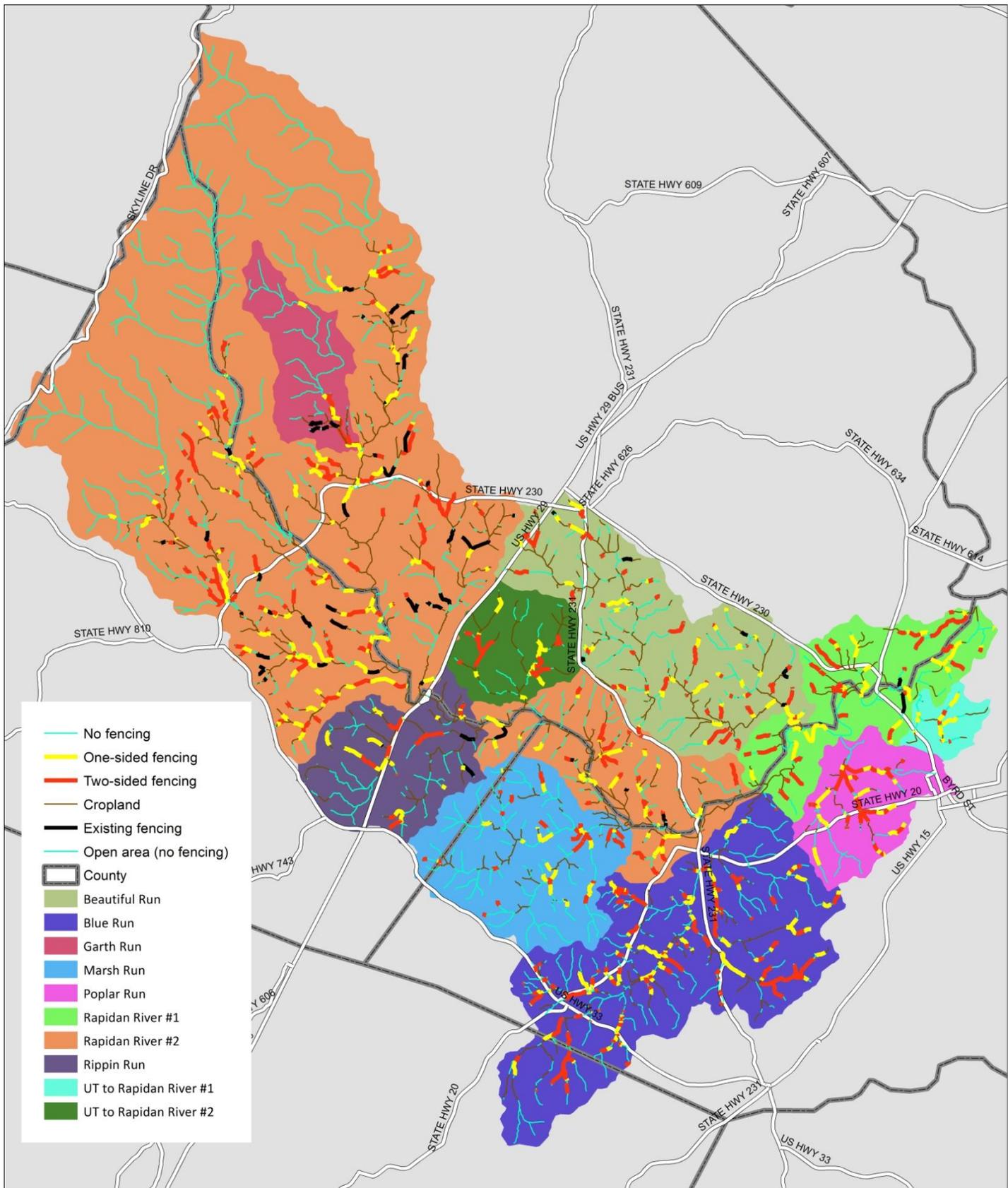


Figure 1. Upper Rapidan River streamside fencing estimates.

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 (\$)¹
Livestock exclusion with 35 ft or greater buffer	CREP	System	18,000	90% + varied incentive	16,200	1,800 ^A
	EQIP	System	15,000	75%	11,250	3,750
	SL-6	System	35,500	100%	35,500	0
Small Acreage Grazing System with 35 ft setback	SL-6A	System	9,000	50%	4,500	4,500
Livestock exclusion with 10 ft setback	LE-2	System	12,000	50%	6,000	6,000
Stream Protection	WP-2	System	2,500	75%	1,875	625
Grazing land management	SL-9	System	10,000	50%	5,000	5,000
Pasture and hayland re-planting	512	Acres	295	\$165/ac	165	130
Prescribed grazing	528	Acres	70	\$30/ac	30	40
Stream exclusion	CCI-SE-1	Feet	1	\$1/ft	1	0
Forested riparian buffer	CCI-FRB-1	Acre	100	\$100/ac	100	0
Animal waste control facilities	WP-4	System	100,000	75% (NTE \$70,000)	70,000	30,000
Permanent vegetative cover on cropland	SL-1	Acres	350	75% + \$35/ac incentive	298	52
Aforestation of crop, hay and pastureland	FR-1	Acres	450	\$25/ac	25	425
Woodland buffer filter area	FR-3	Acres	450	\$100/ac	100	350
Cover crops	SL-8B	Acres	50	\$40/acre	40	10
Manure / biosolids soil incorporation	N/A	Acres	25	N/A	0	25
Retention ponds	N/A	Acres ²	150	N/A	0	150

¹ Does not include tax credit or in-kind service; ^A Value does not reflect incentive payment; ² Acres treated by control measure